THE MADRAS
MONTHLY JOURNAL
OF
MEDICAL SCIENCE.

No. XXXIII.—SEPTEMBER, 1872.

ORIGINAL ESSAYS.

Art. XI.—*Report of the Medical Committee appointed to investigate the causes of the Epidemic Fever which has prevailed in the Provinces of Coimbatore, Dindigul, Madura and Tinnevelly, during the years* 1809, 1810, *and* 1811.

(*Continued from page* 121.)

SECTION SECOND.

The Climate that has been experienced in these Provinces since November 1808 *up to the present period, contrasted with that above mentioned, with its effects on the cultivation of the soil.*

We shall now proceed to say something of the climate that has prevailed in the districts in which the fever has raged for three years past; by comparing which with that of common years we shall find in the result that irregularity of season and that unnatural state of the atmosphere at certain periods which we conceive to have been the great general cause of all those ills which have occurred.

The years 1804, 1805, 1806 and 1807 were remarkable all over the Coimbatore, Dindigul, Madura and Tinnevelly districts for their dryness; but they were very healthy. In 1808 a great deal more rain fell in the three first mentioned districts than there had done for several seasons before; but in the Tinnevelly province the monsoon of that year was unusually heavy and was succeeded by a more than common cold wind in January and February 1809.

The monsoon of 1809 was of more than usual severity, but less so in Tinnevelly than in the northern tracts of our prescribed range. It began very early and at first mildly in the Coimbatore, Dindigul and Madura districts, that is to say, little rain fell in those countries early in November: but, when the month was more advanced, and in December, the fall for several days was heavy and incessant, and the Cavery and Vyaar rose to a prodigious height; particularly the first, which overflowed its banks to a greater extent than it had ever been known to do by the oldest inhabitants of Trichinopoly.

January and February 1810 in Madura and Dindigul were pleasant months and the air in the former cold and bracing, but in Tinnevelly it proved neither. In the northern districts of our range there were occasional showers about the end of March, in April and at the beginning of May, with their usual attendants at this season, clouds of dust, thunder and whirl-winds; but the southerly winds were much weaker than usual and must on that account have but partially ventilated many tracts situated amongst the hills as well as others which border on them. No rain fell in Tinnevelly till late in May, when the south-west monsoon burst over the Western Ghauts, but not with more violence than common.

The west wind in 1810 was observed, in the northern districts as well as in Tinnevelly, not only to be less strong than usual but in place of continuing to blow fresh till the end of August or beginning of September it lulled early in July. Heavy rain fell in August and September; October and November were excessively close and sultry. Late in the latter month the north-east monsoon commenced in the Dindigul and Madura countries and poured over them absolute floods, bursting their tanks and laying all the low lands under water. Torrents rushed down the sides of the mountains in the first mentioned district, with such violence that several hamlets were swept away in the Toddy-

comboo division. The Vyaar river at Madura was impassable even by elephants for many days and flooded the country east of that capital for miles.

" The great tank at Ramnad, in which this river terminates " its course and which usually is not filled for seven years " together, burst its banks and ran into the sea. Reservoirs " of water that had been dry cultivated or pasture fields have " since those unusual rains contained more or less water and " the ditch surrounding the Fort of Madura particularly, " which for years had been dry, has been constantly kept full " of water. The level of the water in the wells within the " Fort, which in 1806 had been 20 feet from the surface, " has risen at times to within 3 feet of it."*

In the Tinnevelly district the rainy influence of the north-east monsoon, which we have observed in common years not to be so considerable as in those situations lying further north, was this season severely felt. The rains began late and at first were trifling in quantity, but on the 5th of December they commenced falling in torrents, and continued so to do till the evening of the 8th, when the Sytaar and Tambarapoornie came down in vast and sweeping floods, destroying several villages,† causing the loss of many lives, carrying away hundreds of sheep and cattle, overflowing the country for miles and rendering insular the habitations of most of the Europeans belonging to the stations of Palamcottah and Tinnevelly.

The same rains brought a great accession‡ of water into the salt marshes, which was kept up by the subsequent floods falling out of season in February, March and April. The consequence was, that in place of the vapours from these swamps being quickly exhaled by the dry weather which usually ensues after the monsoon, they continued for a period of nearly four months, and to a season when they could not fail of proving most injurious by being converted by the superagency of a close and sultry heat from a simple saline exhalation into putrid, salt-marsh miasmata: the fatal effects of which have been but too severely felt, as may be

* See the paper of the 3rd Member of this Committee which has lately been laid before Government by the Medical Board.

† And a still greater number of huts, particularly those of Toddy people, in the talook of Calcaud.

‡ To such an extent did the water then rise in some parts that it reached half way up the Palmyra trees.

seen by referring to the account of the deaths in the talook of Punjmahal.*

The inundation in December 1810 did not produce, as might have been expected, that cold state of the atmosphere which usually follows the north-east monsoon rains—a singularity which was not confined to Tinnevelly, but also distinguished this season in Madura, Dindigul and Coimbatore, in which provinces the mouths of January and February were remarkable for a very faint north wind and a hot and clear sun-shine. February, March and April, which in proper seasons are proverbially dry on the Coromandel Coast, this year exhibited all over the southern territories a rare, unnatural and extraordinary variation of heavy† *rains*, accompanied by the still more uncommon phenomena of an occasional north-east wind and much thunder and lightning.

In speaking of the climate of these provinces in regular seasons we observed that during the months of March, April and part of May strong ventilating and scorching winds prevail; but such was not the case in 1811. On the contrary, the southerly wind was languid and wavering, the most distressing lulls were frequent, quickly alternating with sudden gusts of bleak air and accompanied with heavy showers from the north or north east. But if this feeble state of the southerly wind was so conspicuous in the open country, what must it have been in situations near to, or altogether amongst the mountains where, at this season, a dry ventilation is essentially necessary? What was peculiarly observable in the state of the atmosphere at this time (the period too at which the epidemic raged with the greatest‡ *violence*) was a certain denseness in it, sometimes almost creating a difficulty of breathing, a feeling we had occasion to experience about the middle of April at Dindigul; and we learn from Mr. Hepburn that at Tinnevelly it was equally remarkable and as distressing. There was besides during

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* See No. 5, a paper which accompanies this report.

† These rains, truly called unseasonable, began early in February and continued more or less during the greater part of it. About the beginning of March they fell very heavily for days together and were frequent during the rest of the month. In April there was much rain and the sun was generally obscured by clouds. May was drier, though by no means so much so as in common seasons.

‡ From every account we have received it appears that the most unhealthy period in all the four districts was from towards the end of February to the beginning of May 1811.

these months a singular oppressive, hot and steamy vapour, which rose from the ground and which gave a sensation not unlike what is occasionally experienced from a crowded assemblage of people in hot weather. Added to all this, the dews, which in common seasons are pretty well over by the middle of March, continued to fall heavily so late as the 19th and 20th of May and could not fail, by chilling the body after the relaxation of a hot night, to prove productive of infinite mischief.

The west wind did not begin to blow so early as usual this season and was by no means so strong as it commonly is, through the whole extent of the four districts. After having commenced it ceased again for several days, towards the end of May, giving place to gentle airs from the east and south-east in June; and early in July it was everywhere observed not to be so powerful as usual, and in the Streevulputtore Talook of the Tinnevelly district there were great complaints of its inefficacy; though it has since blown with greater force and now (the end of August) the climate not only appears to be nearly what it ought to be, with regard to winds,* but to have in a great measure gratified the hopes and expectations of thousands, by changing the constitution of the atmosphere and almost entirely banishing the epidemic fever.

From the account which we have thus given of the climate of Coimbatore, Dindigul, Madura and Tinnevelly for the last three years, it will readily be allowed that the different seasons during that period have varied much from their common course. Inordinate rains have succeeded to uncommon drought; the north-east wind and land-wind have been weak as well as of undue duration; the most distressing lulls have alternated with sudden and chill blasts from various directions; and last of all, and what appears to have brought the mischief to a crisis, heavy rain and close sultry weather have taken place at those times which are usually distinguished by dryness and by those ventilating breezes which exhale the superfluous water from low and marshy

* From a due degree of strength in the drying and purifying west wind we ever conceived that much benefit was to be looked for. In the Carnatic, where such winds are always dry, epidemic fevers are not known, as was noticed by Dr. Lind many years ago. Zimmerman in his "Experience" dwells much on the advantages often derived from strong winds by purifying the air from noxious vapours. See his Experience, Vol. 2nd, page 154. English translation.

situations and dispel the dews and vapours which never fail to occur after the ceasing of the north-east monsoon. Thus there has been constituted an extraordinary and unnatural state of the atmosphere, everywhere unsalutary in the tracts in which it was produced, or into which the distempered miasmata may have been carried by particular currents of air.

The stagnation, vegetable putrefaction, dampness, filth and offensive effluvia, the natural consequences of what we have just stated, have proved evils of no small consideration, particularly in low or ill-ventilated situations.

The 2nd Member of this Committee in travelling from Darampooram to Dindigul in the beginning of June, and on passing along the banks of several marshy tanks, as well on the western frontiers of the first mentioned district as in the Toddycomboo talook of the second, was assailed by a noxious and sickening exhalation which somewhat resembled bilge water. And the President and 3rd Member experienced exactly the same effect from similar causes towards the end of the same month in passing from Towerincourchie to Cottampetty in Madura province; and again for several miles on the road leading through and on the north side of the large and beautiful town of Streevulputtore in Tinnevelly country.

It can easily be supposed that a continuance of unseasonable weather for several years together must, with other bad consequences, have proved injurious to the cultivation of the soil. In Coimbatore, however, which is chiefly a dry-grain country, in which superfluous water is quickly carried off into rivers and nullahs, this has not been conspicuous; and by Mr. Garrow's return it does not appear that any particular sickness has prevailed amongst the cattle of that district.

With regard to the Dindigul country, we had occasion, while there, to observe in the month of April last that so general was the sickness and so great had been the mortality that the Sumbah crop of paddy was actually in some places rotting on the ground from a want of hands to cut it down. And Mr. Peter informs us that many thousands of cattle have died in the different divisions under his management since the time that the epidemic first commenced, as much, we are inclined to think, in consequence of the unnatural state of the air as from a scarcity of hands to feed and take care of them.

In Tinnevelly, we understand from Mr. Hepburn, that not

less than 44,273 cattle have died in his Collectorate since the beginning of February last; not so much from any particular disease as from an excess of moisture in the air and a want of people to take care of them. Mr. H. has further informed us that the great Peshanum Sumbah crop, which is gathered in February and March, was got in in a much less perfect state than usual, from its being so frequently wetted and from the inhabitants being obliged to cut it down before it was quite ripe, owing to the dread they entertained that, if they allowed it to stand longer, they would lose a great part of it from the violence of the rains. Such stunted and immature grain, when stocked, was apt partially to ferment and get heated, which rendered it a much less wholesome food than if it had been cured in a better condition; and he has also said, that so general has this calamity proved in the Tinnevelly district that the greatest difficulty has been experienced in procuring the small quantity of grain required for seed for the cultivation of the present year. The dry grains from the same cause have also suffered much, and must in consequence have been rendered less nutritious.

Having deemed it proper at this part of our Report to notice the circumstance of the crops of these countries having suffered much from unseasonable rains and that the quality of the edible products had been thereby injured, we must here observe that though the necessity thus induced of eating a somewhat less wholesome grain than usual cannot be considered otherwise than as a great misfortune, yet it can form no part of the original cause of the epidemic fever which had commenced at a period antecedent to the failure of the harvest, though it certainly may by inducing debility have contributed much to augment the fatal nature of the disease.

SECTION THIRD.

Rise, progress and direction of the Epidemic in the different districts. Numbers that have died of the disease within certain periods, compared in some instances with those in common years. At what time the Fever appears to have raged with the greatest violence.

When it is considered that one great cause has chiefly prevailed in producing a distempered constitution of the at-

mosphere in the southern provinces of the Indian peninsula, we are much inclined to think that, although in some of these countries the effects may at first have been but trifling (and therefore little noticed), they must all have suffered in a greater or less degree nearly about the same time; with this difference, that such tracts as from their situation or peculiar nature were most fitted for nourishing or increasing the operation of the evil would, of course, feel its influence to a greater extent.

After several years of unusual drought, we observed that heavy monsoons and irregularity of climate became conspicuous in 1808, and have continued to be so up to the present period; and it is from the commencement of this deviation from natural order that we can trace the earliest approaches of that sickness which has since proved so fatal.

The first public notice we have of the epidemic fever (except Dr. Christy's official communication to the Superintending Surgeon of the Southern division in 1808) is that of Mr. Garrow, in a letter to the Revenue Board, of date the 25th of October 1809, about which time he speaks of its having severely raged in his Collectorate in the Chuckragherry taluq, at places called Columbum, Cullapuram and Comaralingum, and which, he adds, are close to the hills, marshy and proverbially unhealthy. It soon after extended to many other villages in a northerly direction, thence eastward to others in the vicinity of Darampuram, and in October last it had made its way still farther towards the north. But by Mr. Garrow's account it received a check in January 1811, not however before it had committed great havoc, especially from the months of January 1810 to June of the same year, during which period 8,924 persons died in the Coimbatore division only.

The favourable hopes that were entertained at the beginning of the year 1811, we are sorry to say, were but too soon blasted, for after the untimely rains in February the disease recommenced its work of destruction with great severity and spread not only amongst those villages, the most liable from their low sites to be visited by such maladies, but to others standing much farther east, high, dry, and, in common seasons, healthy.

Mr. Garrow has informed the Committee that the almost universal opinion in Coimbatore is, that the epidemic fever first entered that district from the direction of the Pylny mountains and, according to his own observation of the

malady, its course has been from south to north, inclining towards the east, and from the hills near to which it first shewed itself, after the most unseasonable of all the irregular weather we have mentioned;—we mean that occasioned by the falling of heavy rains and dews in February, March and April.

Although the statement we have of deaths from the Collector of the Dindigul district does not extend farther back than to the 1st April 1810, yet we are well aware that the epidemic had been prevalent there before that time. By information received on the spot, we know that many had sunk under it at a period antecedent to that above mentioned, especially in the sequestered zemindaries of Neelacotta and Sundyhoor, and in the Toddycomboo division.

There is in this province also a general belief that the Pylny mountains gave birth to the evil; it certainly evinced the same peculiarity here that we observed in Coimbatore, viz, that it was first noticed in low situations near the hills, and afterwards, as the general cause extended, its baneful influence spread to tracts naturally drier and more healthy.

We see by Dr. Christy's paper that a fever prevailed in certain parts of the Madura district as early as 1809, and more or less in the fort itself about the same period. It would seem at that time, however, to have been chiefly confined to the poor who occupied the lowest huts and seldom attacked the better sort of people who lived in elevated houses of brick and stone and slept on couches, nor were many Europeans that year affected by it.

In 1810 the disease became more general and alarming than in the former season, as well in the city of Madura as at other places of the provinces. It now neither spared Europeans nor the more wealthy inhabitants and proved fatal in many instances. But, as in the other territories we have mentioned, the months of February, March and April 1811 appear to have been by far the most calamitous era, no doubt from the causes we have already assigned.

In this district, like the others within our range, the Pylney mountains are considered by the native inhabitants as the great cause of all their misfortunes; but here we find an extension of the epidemic, not as in Coimbatore from south to north, but from north to south. Here it has also been invariably remarked that it was in low situations close to the hills, such as at Towerincourchie and Sholavandum, that

the fever first attracted notice, and that the rains and close weather in February, March and April had the unhappy effect of diffusing the morbific *miasmata over tracts* farther east than they had before reached and comparatively high and dry. Divisions, however, nearer to the sea, or rather farther from the range of mountains in this Collectorate (such as those of Shevagunga and Ramnad*), have nearly escaped the disease altogether, as was witnessed by the 2nd and 3rd Members *of this Committee during an excursion they lately* made through that zemindary.

The Collectorate of Tinnevelly seemed for a time as if kind Providence had averted from it the mischief which was destroying so many thousands in countries lying but a short distance from it; but it soon appeared that the evil was only retarded. *It is true that* in the months of March, April and May 1810, as we are informed by Mr. Hepburn, fever had attracted a little notice in the northern and western parts of the district. It was, however, trifling and but of short duration and no more was heard of it till the month of February† 1811, when it shewed itself very *generally* in the talook of Strevulputtore (which is contiguous to the Madura province) and in Tencoushie, both of which lie near the mountains. Soon after this it broke out in the vicinity of the sea and salt marshes, and committed great ravages in the Punjamahal‡ and Calcaud § talooks; and lastly, it extended itself from Tencoushie to the more southern tracts (including the Pollams) and kept on its course all the way to the sea; but invariably proving most destructive in those villages situated nearest to the hills.

From the above account there will be observed this singularity, that in the neighbourhood of the salt marshes the disease made its appearance at a period prior to that at which it first began in places lying betwixt them and

* Kileany and its neighbourhood must here be excepted, where, from the vicinity of a salt marsh, the fever has been prevalent for some months past.

† It was at this period that many pilgrims returned from a feast at Pylny where the fever then was and had been for many months. These pilgrims had left their own villages about the end of January 1811, at which time there was no fever in them. Shortly after they had come back to their own homes, however, they were all seized with fever and we are sorry to add that scarcely one of them is now living.

‡ This talook stretches from Shengulotum to the southern extremity of the peninsula.

§ This stretches from Trichindore to Manapar along the seaside; twelve villages in it have suffered dreadfully.

Tencoushie—a circumstance which leads us to conclude that, in these briny swamps of the Tinnevelly district, a separate source of the disease is to be looked for from that which occasioned the sufferings of those inhabiting the more northern divisions of the same Province.

The malady, on its way south from Tencoushie, would appear to have got first into the Brumadashum* talook in an alarming degree about the beginning of March, especially in the village of Veeramasingaporum (near the Papanossum cataract), in which so great a mortality soon ensued that it was with difficulty hands sufficient could be procured to bury the dead. In Shermadavy the epidemic was felt somewhat later (not before the beginning of April), and then, though numbers died of it, neither was nor has since been so severe as in some other divisions, owing perhaps to its having the Polygar countries betwixt it and the western mountains.

In Nelleumbalum, in which talook the city of Tinnevelly stands, the disease, if the city itself is excepted, did not commence so early as in situations nearer to the hills. In the month of April, however, it appears to have been very prevalent, as most of the inhabitants were then sick and many died, particularly in the town of Caddium. In the talooks of Vedoogramum, Stryvygoonthum, Gaingoondum and Alvartinnevelly, the disease has been much less destructive than in other parts of this province, although in them there has also been a greater degree of sickness than in common years; and this peculiarity in their favor we can only account for from their lying at a considerable distance from the great ghauts and from their standing higher above the level of the sea; to which causes also is, in a great measure, to be ascribed the comparative healthiness of Shenkernacoil, which extends to the hills only at one corner, being at other points separated from them by the Pollams of Shevagherry and Chokumpetty.

From what we have said of the rise and progress of the malady in the province of Tinnevelly, it will be concluded that the general direction of the morbific influence has been here opposite to what it was in Coimbatore (which was from south to north and a little east), and that it corresponds with that which it took in the Madura district, which was from north to south. We have moreover ob-

* Most of the villages in it lie near the hills and are surrounded by much low and marshy ground.

served that the closer to the hills the more certain was the danger and that in some tracts in the vicinity of the salt marshes, along the sea-side, there appears to have been altogether a separate spring of epidemic malignity.

With regard to the two opposite directions in which the distempered exhalations seem to have extended themselves in different parts of the peninsula and the cause or causes of this varying course, we confess that we give our sentiments with great hesitation, as the subject not only involves in itself considerable difficulty but naturally leads to some yet undecided points and to the theories and opinions of certain ingenious men respecting the propagation and diffusion of miasmata and contagion.

We have repeatedly noticed that great irregularity of seasons had taken place throughout the whole of the Southern provinces and it is certainly allowable from a universal cause to look for a general result, but while the same description of universal climate may have prevailed in all those territories, yet the lands themselves may have had localities or peculiarities of such a nature, as, although under one common influence, to have proved productive of effects differing much in degree. Thus it is that a long continued unnatural state of the air, operating upon the close and overgrown woods of the Pylny mountains, upon their unventilated vallies and stagnant marshes, could not fail to engender a more rapid and dangerous mal-influence than the operation of the same seasons on the drier and less jungly plains of the eastern ranges of the peninsula. In the same manner and for the same reason, the changed constitution of the atmosphere has been creative of ill effects in the vicinity of the salt marshes of the Tinnevelly country, differing much in extent from those experienced in other estates which, though at no great distance from them, are otherwise circumstanced with respect to nature and situation.

The fever which has occasioned so great a mortality on the Coromandel Coast was first purely endemic and, in all probability, had the irregularity of seasons been of short duration, it would not have been heard of beyond the sources from which it sprang, although we find, and that from high authorities*, that even the causes of endemic fever are some-

* See Dr. Jackson's remarks on the Constitution of the Medical Department of the British Army, page 212. See also Zimmerman's Experience, Vol. 2nd, page 155, English translation.

times carried by particular currents of wind to a considerable distance; but on the disease having been rendered epidemic by the same means* which bring about this change in every quarter of the world, its nature as usual became in some respects altered. "Fevers of this sort," (says Dr. Jackson) "arise in particular countries or districts of "a country; they travel in certain tracts, sometimes con- "fined to narrow bounds, at other times they are more "widely diffused."

We have seen this epidemic of India spreading its poisonous breath from south to north and a little east in Coimbatore province, as much perhaps in consequence of the extension of moisture combined with heat, as it may have been assisted on its course, from what the natives suppose to be the grand endemic source (the Pylny mountains) by the south-west winds in the months of March, April and May. In the Dindigul territory this mischief, if carried by the winds, had not far to travel from the same unwholesome spring. Independent of which, however, the Dindigul district had *in itself* other localities extremely likely from their nature to have generated endemic fever; such as the low Toddycomboo division, the valley and that singular mountainous amphitheatre which surrounds Towerincourchie and its marshy neighbourhood.

The garrison of Madura and other places situated nearer to the hills in this district become absolute hot beds for fever in the seasons we have had occasion to lament, and must, if the notion be just that the morbific miasmata can be conveyed from place to place by particular currents of air, have been of extent sufficient to have affected the whole province.

Tinnevelly, we have seen, did not suffer much before the heavy rains in 1811 and at that time there are two ways in which we may suppose the evil to have been produced, viz., either as originating and spreading from endemic sources within the district itself, or as it may have been conveyed hither by the north-east monsoon winds which still prevail in the month of February, and perhaps both of these may have had their share in bringing about the general

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* Hoffman tells us that intermittent fevers are most common in autumn and spring, and that they are endemic in low marshy situations; but that, when rainy, variable seasons succeeded hot summers, they frequently become *epidemic.*—Vide Medical Rat. Syst. Part I. Cap. I.

calamity,* though we confess we are inclined to think that if the extension of the disease was as much occasioned by miasmata being carried by the breeze as it is dependent on a peculiar and general state of the air, we should occasionally see it spread itself wide of those tracts it has invariably been observed to pursue and which are ever found to be those nearest to, and in the direction of, the great endemic sources.

We regret that the account of deaths which we have received from the different Collectors are not all for equal periods, nor made out according to one prescribed form; circumstances which will prevent us from rendering such exact comparative statements as we otherwise should have had it in our power to have done. We trust, however, that they will not be unsatisfactory, as they will shew the varied extent of the calamity in the different districts. The return† of deaths transmitted to us by Mr. Garrow for the Coimbatore Collectorate is for sixteen months, that is, from the 1st of January 1810 to the 30th April 1811, during which time there died in the different talooks (twelve in number) 12,458 males and 9,993 females, making a total of 22,451. The population‡ of the Collectorate in Fusly 1219 amounted to 596,606, so that on the whole population we may reckon that in the sixteen months there have died about 3¾ per cent.

To shew the centage of deaths in the different talooks of this province, compared with their varying population, we have constructed the following table, by which it will appear

* However singular the coincidence of the pilgrims having brought the epidemic fever with them on their return to Tinnevelly from Pylny in February 1811, we cannot allow, at all events we deem it not probable, that the malady was in any degree propagated in this district by means of contagion, and Dr Jackson has told us that no medical fact is better established than that diseases of this nature are not contagious.

† See No 1, a paper which accompanies this report.

‡ See No. 2, a paper which accompanies this report.

that in the Pillanche and Satimungalum divisions, both contiguous to the mountains, the fever has been the most destructive; the first having lost during the period abovementioned $6\frac{15}{16}$ per cent. of its whole inhabitants, the other $5\frac{1}{16}$ per cent:—

Talooks.	Population.	Deaths.*	Per centage.
Coimbatore	83,882	3,558	$4\frac{1}{4}$
Cheroor and Cooroomandoor.	50,413	1·896	$3\frac{3}{4}$
Parindorie	53,193	1,503	$2\frac{13}{16}$
Erroad	32,326	861	$2\frac{5}{8}$
Andoor	44,306	1,955	$4\frac{3}{8}$
Satimangalum	50,326	2,567	$5\frac{1}{16}$
Colingall	44,426	1,712	$3\frac{13}{16}$
Caroor	54,015	1,691	$3\frac{1}{8}$
Darampooram	59,047	1,461	$2\frac{7}{16}$
Pillanche	41,438	2,878	$6\frac{15}{16}$
Chuckragherry	44,478	1,260	$2\frac{13}{16}$
Pullaundum	38,756	1,109	$2\frac{13}{16}$
Total...	596,606	22,451	$3\frac{3}{4}$

The statement* which we have received from Mr. Peter the Acting Collector of Dindigul district, shews the number of people who have died in it during a period of

* See No. 3, a paper which accompanies this report.

twelve months, that is, from the 1st of April 1810 to the 31st of March 1811, contrasted with the deaths which usually happen in the course of a common year.

In the four divisions of Toddycomboo, Iyempilly, Tenkerry and Wootampolam, and in the minor and sequestered Zemindaries, there have died of males and females together within the twelve months 21,510.*

In healthy years the mortality is said to be annually about 3,438, which makes a difference of 18,072. The population of the Divisions and Zemindaries in Fusly 1212 amounted to 295,654, so that in the twelve unhealthy months there has died about $7\frac{1}{4}$ per cent. of the whole inhabitants. The different divisions of this district have suffered in the following proportions:—

Where 100 men would have died in common years in the sequestered Zemindaries, there have died within the period above stated 832

Do.	do.	in the minor Zemindaries	733
Do.	do.	in Wootampolam division	675
Do.	do.	in Toddycomboo	591
Do.	do.	in Tenkerry	513
Do.	do.	in Iyempilly	484

So we find that the sequestered Zemindaries have been the most unhealthy and the division of Iyempilly the least so.

The statement† which we have received from Mr. Peter, the Acting Collector of the Madura district, is also for twelve months up to May 1810, by which it appears that in the seven talooks of Maudakolum, Sholavandum, Teramungalum, Aunyoor, Thoorumboor, Mellore and Nattum there have died, males and females together, 24,626. In a healthy season the number of deaths is said to be about 3,933 annually, which makes the great difference of 20,693. The population of the province in Fusly 1212 amounted to 245,554, so that in sickly months there died about the proportion of 10 per

* The deaths in the thirteen Pollams of this district are not here included as they have not been given to us with confidence, owing to the returns from these countries being not altogether within the control of the Collector. They (the deaths) are *supposed* to have amounted to 12,601 from the 1st of July 1810 to the 31st of March, 1811.

† See No. 4, a paper which accompanies this report.

cent. of the whole inhabitants. The divisions of the Madura district have suffered in the following proportions:—

Where 100 men would have died in common years in the talook of Nellore, there have died in the twelve sickly months. 1,147

Do.	do.	in the talook of	Mandakolum.... ...	$821\frac{3}{8}$
Do.	do.	do.	Sholavandum... ...	$772\frac{3}{8}$
Do.	do.	do.	Aunyoor......... ...	601
Do.	do.	do.	Teramungalum. ...	592
Do.	do.	do.	Thoorumboor... ...	507
Do.	do.	do.	Nattum.......... ...	$486\frac{5}{16}$

By the statement* delivered to us by Mr. Hepburn, Collector of the Tinnevelly district, it appears that in the eleven divisions of Shermadavy, Nelleumbalum, Vedoogramum, Bramadashum, Tencooshie, Streevulputtore, Shenkernacoil, Stryvygoontum, Calcaud, Alvartinnevelly and Punjmahal, together with twenty-seven Pollams, there died within five months, that is to say from the beginning of February to the 30th of June 1811, of males and females together 38,202. The population as it appeared in Fusly 1211 amounted to 690,696, which gives a centage of deaths in that period of about $5\frac{1}{2}$.

The following is the centage proportion of deaths in each particular Division, calculated according to the respective population:—

Tencoushie	12	per cent.
Streevulputtore	$6\frac{1}{2}$	do.
Bramadashum	$6\frac{1}{2}$	do.
Calcaud	$5\frac{3}{4}$	do.
Punjmahal	$5\frac{3}{4}$	do.
Nelleumbalum	$4\frac{1}{2}$	do.
Shermadavy	$4\frac{1}{4}$	do.
Vedoogramum	4	do.
Shunkernacoil	$3\frac{1}{2}$	do.
Stryvygoontum	$3\frac{1}{2}$	do.
Alwartinnevelly	$3\frac{3}{4}$	do.

It would therefore appear upon the whole that in the District of Tinnevelly the epidemic fever has raged with the greatest violence, as in the short period of five months $5\frac{1}{2}$ per cent. of the population have fallen a sacrifice to the disease; but to render our account the more satisfactory,

* See No. 5, a paper which accompanies this report.

we shall add a short table showing, in some measure, the comparative calamity that has befallen the respective provinces:—

	Population.	Deaths.	Centage of Deaths.
Coimbatore for 16 Months...	596,606	22,451	$3\frac{3}{4}$
Madura for 12 Months ...	245,654	24,626	10
Dindigul for 12 Months ..	295,654	21,510	$7\frac{1}{4}$
Tinnevelly for 5 Months ...	690,696	38,202	$5\frac{1}{2}$
Total...	1,828,610	106,789	$5\frac{13}{16}$

SECTION FOURTH.

Causes of the Epidemic, with suggestions respecting the circumstances that may have rendered it peculiarly fatal in particular situations and to certain descriptions of people.

Celsus,* one of the most correct observers amongst the writers of antiquity, has said that those seasons are ever the most salutary which are most uniform, whether hot or cold, and that those which vary much are the sickliest—general principles which, we believe, have never been disputed. We conceive them to have operated powerfully in producing the evils which we have been called on to investigate; and in the Third Section of this paper we have noticed that so justly were they appreciated by Hoffman that he deduced from them his general remote cause of epidemic fever.

The actual state of the atmosphere which engenders this malady no one† has been able hitherto to detect, though

* Vide Celo. Lib. III., Cap. I.

† See Dr. Jackson's Treatise on the Fevers of Jamaica, page 78.

much ingenuity has been displayed on the subject; and we may with safety say that when Sydenham* ascribed such complaints to a "secret constitution of the air," he gave us as satisfactory an account of the matter as any more modern author has since done. But although we cannot positively determine what this "secret constitution" is, we can pretty nearly ascertain under what circumstances it arises.

Dr. Cullen has used the words *marsh miasmata* to express what he conceives to be the remote causes of remitting and intermitting fever; and although the chemical nature of the distempered exhalations has not yet been discovered, owing to the poison being so completely mixed and blended with the air, he expresses a firm belief in the truth of his assumption, from the maladies of the nature in question so constantly prevailing in low and swampy situations. Many such we have taken notice of in the First and Third Sections of our report. This opinion, however, of the cause of fevers of the intermittent kind has been perhaps too implicitly adopted by some modern writers, who seem to think that a state of the atmosphere capable of generating the disorder can only take place in marshy countries, though it is well known that noxious vapours from woods, especially if thick and ill-ventilated, are as certainly a source of the same mischief—a fact which has been mentioned by Dr. Donald Munro,† but more particularly by Dr. S. Farr in his ingenious Preliminary Discourse to his translation, of Hippocrates' History of Epidemics. There he tells us that wild woods in uncultivated countries have been observed to give birth to that peculiar condition of the air which may be the cause of epidemic diseases. Admitting then, which we most readily do, this second source of the malady, we shall not be obliged to look far for it in the southern district, as not only are all the mountains and their intervening vales which form the western boundary of these countries covered with wood, so overgrown as to be in many places almost impervious; but there are in the Dindigul and Madura provinces many other detached hills and valleys between, thickly clothed with jungle and various sorts of rank vegetation, to say nothing of the extensive tracts of underwood so frequently to be met with.

* See Swan's Sydenham, pages 7 and 8.

† See Dr. Donald Munro's Observations on the Diseases of Soldiers, Vol. II., page 68.

There is still a third origin of morbific miasmata to be found in the Tinnevelly and Ramnad districts, that is, the salt marshes, in the neighbourhood of which we have seen that, in the months of February, March and April last, the fever raged with more than common severity.

Sir John Pringle* has told us that there is a peculiar kind of damp which rises at low water from a beach covered with slime, the more liable to corruption on account of the mixture of salt and fresh water. Dr. Jackson† has, however, disputed the correctness of this opinion. He says indeed that it would be vain to deny that the vicinity of lakes in which there is a mixture of salt water is often unhealthy, yet he affirms with confidence that it is seldom more so than when the lakes are altogether without this admixture; and he adduces proof in support of what he advances. Which of these opinions is correct we know not. In parts adjacent both to the briny swamps near Kilkerry in the Ramnad country and to those in the Punjmahal talook of the Tinnevelly district, the epidemic was particularly destructive; but whether this may have been owing simply to the exhaling influence of the sun upon extensive marshes flooded to a very considerable degree, or in any measure consequent on the salt water they contained, we shall not venture to say.

We have now seen that three great remote causes have been assigned for remittent and intermittent fevers, all of which we conceive have contributed to produce the calamity which has proved so fatal in these fine provinces. But marshy situations do not appear of themselves to be sufficient to render such affections epidemic. To produce this effect there is required the superagency of a close, moist and *sultry*‡ heat and an imperfect§ ventilation: hence it is that, in common years, there is not produced in many of the low situations we have particularized a miasma of sufficient malignity to excite the general disease, because in such cases the exhalation of superfluous moisture takes place during the cold months of December and January when they are comparatively innocent. But rains, falling out of season and in great abundance at periods when the weather had become hot, and when there was so distressing and un-

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* See Pringle's Observations on the Diseases of the Army, page 3.

† See Dr. Jackson's Treatise of the Fevers of Jamaica, pages 81-28.

‡ See Dr. John Clark's Observations on the Diseases of Long Voyages, Vol. I., page 157.

§ See Pringle's Observations on the Diseases of the Army, pages 3, 4.

natural a deficiency of free ventilation in the atmosphere, occasioned vaporations of a very different nature and which, we conceive, became a positive source of mischief by bringing on that corrupt and stagnant state of the air which is ever closely connected with the decay, decomposition or animation of vegetable matter. Such an offensive condition of the atmosphere we have remarked in our Third Section, was but too often experienced in several of the low tracts of these districts during the sickly season. It was pregnant with most baneful consequences, and strongly recalled to our recollection the following paragraph of a well written paper which may be found in the Medical Repository.*

"The cool refreshing northerly breezes were now exchanged "for oppressive calms, or for humid and sultry winds; "such are the changes which the state and temperature of "the atmosphere undergo in the islands of the West Indies "and elsewhere, previous to the breaking out of some mor-"tal epidemic."

Great deviations† from the natural order of climate, we are happy to think, do not very frequently occur in these regions; as in other tropical countries the seasons are pretty regular and steady, and strong winds blowing from fixed points keep the atmosphere in an almost perpetual state of agitation and of consequent purity.‡ We have seen, however, in the melancholy instance before us, that the very reverse of all this has lately happened, and has been judiciously noticed by Mr. Hepburn in a communication§ he made to the Medical Committee. We perceive that a nearly similar departure from the common course of the seasons took place in the Tinnevelly province in the year 1757, as is mentioned by Mr. Orme in his "History of Hindoostan,"¶ and that it was followed by a like calamity. He tells us that in the month of March the south-west monsoon was so violent as to break completely over the Western Ghauts and descend in vast floods into the Coromandel side of the peninsula, where the rains fell without intermission for two days, destroying crops just ready to

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* See Vol. I of the 2nd Hexade, page 145.

† The native Indians also ascribe epidemic distempers to these unusual deviations from natural climate, as we learn from the Ganetamnotum, an astronomical shastrum, to be found in the Library of the Shiva Pagoda of Tencoushie in the Tinnevelly district.

‡ See Zimmerman's Experience, Vol. II., page 145, English translation.

§ See No. 6, a paper which accompanies this Report.

¶ See his History, Vol. 2nd, page 201.

be cut, sweeping away many of the inhabitants, and ultimately (by creating powerful evaporation during a sultry heat) producing an epidemic disease very fatal in its consequences.

With regard to the effects of the miasmata generated amongst woods and jungles, besides the testimonies already adduced, we beg leave to call the attention of the Board to what has been noticed by a very able writer* on the Diseases of the West Indies (Dr. Fowle), who says that in the uncultivated tracts of those countries, where there is much rank vegetation, where the narrow vallies between the mountains, replete with moisture, are often not sufficiently ventilated, there is produced exhalations at any seasons bad, but particularly so after autumnal rains and sultry heats. He moreover adds that mighty torrents, by washing dead matter, animal as well as vegetable, into low swampy lands, where it is left to putrefy, not unfrequently prove the indirect cause of the most pernicious effluvia; and Zimmerman,† who paid much attention to the effects of air upon the human frame, is of opinion that in woody countries much mischief may not only arise from a deficiency of ventilation, but from the noxious qualities of the trees themselves, in support of which he mentions the bad effects well known to be produced by the poisonous exhalation of the Hippomanes at Surinam.

Dr. Trotter in his "Medicina Nautica,"‡ adopting in a great measure the opinions of Priestly, tells us that growing vegetables are found by experience to purify the air; they add oxygen to it by decomposing the water of the atmosphere and the hydrogen goes to the nourishment of the plant. But this process, he adds, only takes place when there is the light and heat of the sun to assist in the operation. If this notion be just, how many thousand plants and shrubs must there be in the thick wood and jungles that by growing altogether in the shade cannot be supposed to purify the air. On the contrary, they may, by harbouring moisture and obstructing ventilation, prove productive of the most unsalutary vapours, requiring perhaps little else than the concomitants of decayed vegeta-

* See Dr. Fowle's Practical Treatise on the different Fevers of the West Indies, pages xvii., xviii., xix., xx. and xxi. of the Introduction.

† See Zimmerman's Experience, Vol. 2nd, pages 140, 141, English translation.

‡ See Dr. Trotter's Medicina Nautica, Vol. 3rd, page 273.

ble matter and a close and steamy heat to induce that distempered state of the atmosphere which we suppose to be the remote cause of the malady in question— a cause, too, which there is but too much reason to believe was most amply supplied amongst the overgrown, shady, dark and ill-ventilated woods, valleys and mountains of the Dindigul, Pylney* and Madura countries, as well as amongst those of that immense range which we have so often spoken of as dividing the peninsula.

By the experiments of the Abbé Nollet it appears that the electric matter has the power of accelerating the growth of vegetables, and Dr. A. Wilson† makes no doubt but that it promotes putrefaction in animal bodies. It may therefore here become a question how far this matter, which we have noticed was very abundant in the atmosphere during some of the most unhealthy periods, may not have assisted in producing a distempered state of the air.

The predisposing causes of remittent and intermittent fever are well known to be those that operate by producing debility, such as poor or insufficient diet, great fatigue, frequent exposure to cold and damp without proper covering, habitual inebriety, grief, sorrow and mental anxiety; in short, whatever exhausts or diminishes the activity of the powers of life; and hence it is in the present instance that we find the disease has invariably been most fatal in such villages as stand low, or in the vicinity of marshy lands, and amongst the poor‡ and hard working inhabitants, who are ill fed, badly clothed,§ and miserably lodged. And perhaps this cannot be better exemplified than by our now stating that at Madura, in a period of sixteen months up to the 1st of April 1811, there did not happen one casualty amongst the troops at

* The Pylney mountains have repeatedly been mentioned in this report as having been supposed, by a great majority of the natives, to be the positive source whence sprang the epidemic fever; but while there was one great cause (irregularity of seasons) operating so universally and extending to all the districts, we cannot suppose that there was but a single point whence the mischief was diffused; though we think it by no means unlikely, considering the peculiarly mountainous and woody nature of the Pylney division of the Dindigul country (where the hills are of an immense height and so deep as to join the Western Ghauts) that the disease there may have attracted very early notice.

† See Dr. A. Wilson's Observations on the Influence of Climate, pages 18, 19.

‡ See No. 6, being Mr Hepburn's answers to Queries which were put to him by the Medical Committee.

§ Malthus in his Essay on Population tells us that all epidemics make their principal ravages amongst the lower classes. See the work, Vol. 2nd, page 59.

that station, though the poor inhabitants of the garrison were very unhealthy during the same period. Again, at Dindigul out of three companies usually stationed there, but two deaths occurred from the 1st of March 1810 to the 30th of November of the same year, though the needy inhabitants of the town who were comparatively worse fed and clothed were dying by hundreds; and at Darampooram, while the epidemic was at its greatest height, the prisoners in jail who were well fed and lodged in a high, dry sheltered situation, suffered but in a trifling degree.

Supposing then that there exists in the atmosphere the remote cause of epidemic fever and that there has also been superinduced a predisposition to be acted upon by it, there are still another set of causes, termed exciting, which often hasten the approach of the pending evil. Perhaps the most certain of these are exposure to cold and damp, while the body has been relaxed by preceding heat and influence of ardent solar rays on an irritable frame.

The bad effects of the last are self-evident; the mal-influence of the first has been noticed by many writers of distinction, particularly by Pringle* and Bursarius,† and it appears to have proved the certain source of incalculable mischief in these provinces, in which during the months of March and April 1811 the nights were extremely sultry and the dews, which by this time should have ceased to appear, still fell in great abundance. "The heat of the early part "of the night" (says Mr. Hepburn in a letter‡ to the Revenue Board) "induced many of the natives to sleep in the "open air, by which means they become exposed, while "their bodies were still hot, to the chill fogs and damps of "the morning, and which in all probability was the cause "of the fever which ensued."

But if such fogs and damps can be productive of consequences of so serious a nature in our open country, it is but reasonable to suppose that in the neighbourhood of mountains thickly clothed with wood, they must prove still a more certain cause of evil; and so it is that we have in every instance found the epidemic most prevalent in situations close to hills, where, as Bontius § has justly observed,

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* See Pringle's Observations on the Diseases of the Army, page 72, 2nd Edition.

† See Bursarius' Institutions of Medicine, Vol. 1st page 230.

‡ Of date the 14th May 1811.

§ See Bontius' Account of the East Indies, page 100, English translation.

(when speaking of Batavia) there is but too often breathed, about the dawn of day, cold noxious vapours, the more certainly dangerous by their succeeding to the "tepid" warmth of the night.

SECTION FIFTH.

Nature of the Epidemic and its various types—The notions of the Vytians, or Tamil Medical Practitioners respecting it.

The disease which has proved so fatal in the Southern Provinces does not differ in its nature from the common endemic of this country, which at certain seasons* and in peculiar situations† may be every year met with; its having been rendered epidemic on the present occasion is altogether to be ascribed to the causes‡ we have already mentioned.

Pringle has told us that intermittents are "the great endemic of marshy countries," and that they rage most in hot summers during a close and moist state of the air; but he might as well have added "of woody and mountainous country" which are so well known in this part of the world to occasion the malady we now treat of, that in the more northern parts of Hindoostan it is called "the jungle fever," and on the Coromandel Coast "the hill fever."

This disease, as in the West Indies, is either remittent or intermittent according to circumstances of constitution, management of the patient or season of the year; but we are happy to say that the second is by far the most common. Delicate people of naturally irritable habits who have rendered them so by irregularities or want of care§ are sometimes attacked by the remittent form, which either proves bilious or nervous as the constitution inclines. The same happens to those who, with even a stronger frame of

* The most unhealthy season in this district is from the time that the north-east monsoon rains cease to the middle of May.

† Such as amongst the hills in the Ganjam Circars, amongst those near Palavaram in the Rajahmundry district, &c., &c., &c.

‡ Dr. John Clark in his Observation on the Diseases of Long Voyages says, "remittent fever may occur at any time, but seldom rages epidemically except in close, moist and sultry weather."—See Vol. 1, page 157.

§ Some of the worst cases of remittent fever in Europeans we have known, appeared to have been brought on by habits of quacking and taking frequent calomel purges, than which nothing can be more injurious to the digestive powers nor more likely to predispose the body to receive fever.

body and phlogistic diathesis, have been injudiciously treated at the commencement of the disorder, by having bark given to them too freely before proper evacuations had been procured. And it has also been observed by us that, as the season became hotter, the fever was more apt to put on a remittent form than at an earlier period, while perhaps rains were falling and the atmosphere comparatively cool. In confirmation of what we have ourselves witnessed in this respect, we shall add that this peculiarity has also been called to our attention by a well written communication from Mr. Abercromby, Surgeon of His Majesty's 34th Regiment, to Mr. Boswell, Superintending Surgeon of the Hyderabad Subsidiary Force, and we find that both Hillary* and Dr. Maclean† in their works on the Diseases of Barbadoes, and Lieut. Domingo have made similar observations.

The more robust have been usually seized with fever of the intermittent kind, and by every account we have received it appears that males have suffered more than females; and young and those of middle age more than old men and children.

The epidemic fever when it assumes the remittent form sometimes comes on very gradually. The patient for two or even three days before being confined to bed feels himself much out of sorts, his appetite fails him, he has a slight squeamishness at stomach, particularly on seeing animal food; he complains of a feeling of universal lassitude and of alternate heats and chills; there is a stupid heaviness, if not a pain, in the head; the eyes are clouded, the ears ring and the bowels are invariably costive. In other cases the approach of the enemy is more rapid; and rigors, great debility, vertigo, sickness at stomach or vomiting, sooner ensue and never fail to usher in the disease.

The first paroxysm, which is often attended with delirium, and is sometimes in young habits accompanied by a bleeding at the nose, after having continued for a certain period with symptoms varying according to the strength of habit and constitution of the sufferer, terminates in a sweat, not however of that profuse and fluent kind which succeeds to the hot fit of a regular ague, but clammy and sometimes indistinct. It however, has the effect of affording relief by considerably lowering the pulse and cooling the body

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* See Hillary's Observations on the Diseases of Barbadoes, page 91.

† See Dr. Maclean's Inquiry into the Nature and Causes of the Great Mortality at St. Domingo, pages 86,87.

(which in many cases has been heated so high as to raise the thermometer to the 103rd or 104th degree) but neither the natural feelings of the skin nor the proper state of the pulse are thereby induced; the former gives a singular dry and uncomfortable sensation to the touch and the other is smaller and a little quicker than it ought to be; the patient continues languid and has but little appetite for food.

If proper steps are not now taken to bring on a regular intermission, or if from the violence of the disease it cannot be done, this first remission will not be of long duration,* a paroxysm more severe in every respect soon ensues, usually ushered in by vomiting (in some cases of bile), and soon followed by excessive heat of skin, delirium, great thirst, difficulty of respiration and a most distressing febrile anxiety; and the tongue, which at first was only white and foul, now begins to look parched and brownish. The next remission, when it takes place, is less perfect than the first and brings still less relief, and in this way if a check cannot be given to the fever, or if (which they sometimes do) natural loose bilious evacuations do not occur to supply the place of diaphoresis, it will run on its fatal course, each succeeding attack proving worse than that which preceded it, till nature exhausted at last begins to give way. The pulse gradually loses its strength, the countenance shrinks and looks sallow, the eyes become dim, the abdomen swells from visceral congestions and the stomach loathes every sort of food. Shortly after this period hiccough comes on, an alarming stupor takes place of low delirium and death quickly closes the scene. But such remittents have not been very frequent in these provinces and, when they did occur, were, we believe, mostly occasioned by neglect or unpardonable blunders at the beginning of the disease.

The intermittent form of the epidemic is infinitely more common and much more tractable. Dr. Fowle† as well as Dr. James Clark‡ have told us that the rigor in such cases in the West Indies is not so great in proportion to the succeeding heat as it is in England. We cannot say, however, that we have observed any such peculiarity in this country. The cold stage§ here is often of long continuance and most

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* Not usually longer than from five to eight hours.

† See his Practical Treatise on the Fevers of the West Indies, pages 1,2.

‡ See Dr. James Clark's Treatise on the Yellow Fever of Dominica, pages 92,93.

§ Its duration is commonly from half an hour to nearly two hours.

distressing; vomiting often takes place at the beginning of the hot fit and is sometimes succeeded by delirium.

Agues (of all kinds) either commence at once with rigor, or a shaking fit, or they first shew themselves with a febrile attack more or less continued and usually of about two days' duration. This, on going off, by means of the usual remedies, leaves the patient for the most part tolerably well and he continues so for a short time, after which the fever returns and observes the type which is to distinguish it.

With regard to the question of how far this epidemic ought to be considered as contagious, we have no hesitation in saying that we believe it not to be so in any of its natural forms. Whatever might happen in cases which from improper treatment had been allowed to pass into low continued fevers, attended with the usual symptoms of putrescence, though even then it can never extend far in a country like this, where the heat of the atmosphere seems peculiarly inimical as well to its first production as to its spreading, and where the free admission of fresh air cannot fail quickly to break and dissipate the circle of contagion.

The types under which the intermittent has appeared are the following:—1st, simple Tertian; 2nd, the double Tertian, which would seem to consist of the junction of two single tertians that run each a separate and independent course, with similar paroxysms on alternate days; 3rd, Quotidian; 4th, Quartan; and 5th, Irregular. To show which of these has most frequently occurred amongst the natives during the present sickness, we cannot do better than here subjoin a report of the sick in the Regimental Hospital of Dindigul taken on the 1st of June 1811. The effective strength of the detachment being then 255 men.

Simple Tertian.	Double Tertian.	Irregular.	Quotidian.	Quartan.	Convalescents.	Total.
30	26	24	13	4	20	117

Of these 53 had been in hospital for one month, 39 for

two months, 23 for three months, and 2 for upwards of three months.

From the above it will appear that the simple and double tertian types were the most common at Dindigul; and we learn from Dr. Jackson* and Dr. Cleghorn† that they were also those which were most frequently met with in Jamaica and Minorca.

Mr. Sinac has denied that there is any such thing in nature as a regular quotidian, and Dr. James Clark‡ says that he never saw a case of it in Dominica. We cannot, however, doubt of its existence in this country, where, on the contrary, when it does occur, it is almost invariably well marked with paroxysms returning at nearly equal periods, though the cold fit by no means continues so long as in the simple tertian. It is often a distressing affection from its commonly attacking those of weak constitutions; and, by leaving but little time for taking the bark, is perhaps apt sooner to occasion visceral obstructions and œdematous swellings than any other form of the disease.

The quartan type is rare, but we have invariably found it very obstinate and it frequently on that account brings on a morbid state of the spleen and consequent dropsy. Pierre Compet § in his "Maladies graves de la zone torride" makes similar observations. He says that in many instances in the West Indies this form of intermittent fever succeeds a tertian, when badly treated, by which means the morbific humor is thrown upon the abdominal viscera.

The irregular disease, by observing no exact periods, is very troublesome, and seems to us to correspond in its nature with what Hoffman has called "The Semi-tertian."

The types of the fever are sometimes changed during the course of the malady; the conversion of a remittent into a tertian is favorable to the patient, as is that of a double tertian into a single one. Tertians, on the other hand, are sometimes unfortunately (by mismanagement) turned into remittents, irregular or even continued fevers, as are tertian into double tertians, quotidians or quartans.

The Vyteans or Tamil medical practitioners ascribe the epidemic fever chiefly to two causes—a superabundance of

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* See Dr. Jackson on the Fevers of Jamaica, page 13.

† See Cleghorn's Minorca, page 163.

‡ See Dr. James Clark's Treatise on the Yellow Fever of the Island of Dominica, page 61.

§ See his "Maladies graves de la zone torride," page 96.

moisture in the air and earth and the bad quality of the water they have in consequence been obliged to drink. To intermittent fever they give the name of Seetajorum, or in more common language Coolloor Cajil. The most dangerous type, they are of opinion, is the Quotidian or Woodadajorum ; but we are inclined to think that they often confound this with remittent fever, for which, however, they have got a particular appellation Tavajorum,* which signifies a fever accompanied with excessive thirst. The Tertian type they distinguish by the name of Moonamoray jorum, and the Quartan by that of Nalamorayjorum. They allow this last to be of a most obstinate nature, and often have more faith in a change of season for its removal than in any medicine they can administer.

(*To be concluded.*)

ART. XII.—*Note on the Treatment of Bubo.* By Assistant Apothecary STAGGS, 76th Regiment.

WITH the kind permission of Surgeon W. F. Cullen, H. M. 2-24th Regiment, I have been allowed to report the following method of treatment, generally adopted in cases of inflamed glands (inguinal) in the hospital of that corps.

The treatment consists in transfixion by means of an ordinary exploring needle and the subsequent inunction of Unguentum Hydrargyri into the bubo. When a patient presents himself at the hospital with inflamed glands, from whatever cause, he is allowed to rest for a few days; measures are taken to improve his general health if indifferent; and, in the meanwhile, hot fomentations and poultices are applied to the part. At this period, in most cases, suppuration is evidenced by fluctuation, &c.; but even should this not supervene, an exploring needle is introduced *just under* the skin, for about the extent of half an inch at four points, crucially. The immediate result of this is the mere oozing out of a little blood; very little pain is experienced by the patient during the operation; a little mercurial ointment (about ʒss.) is now rubbed into the wounds and surface of the gland morning and evening; no evil results follow; but, after a few days, a very perceptible decrease in the size of the tumour is

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* This name is also given, but improperly to Typhus fever, which the better informed call *Kistnah Doshum.* It is much dreaded amongst the Hindoos, from a supposition that it never takes place but to mark the vengeance of heaven for the commission of some heinous crime.

noticed: at all events, at the end of a fortnight, usually from date of operation, the patient is considered fit for duty. It has been found necessary in some instances where the decrease proceeds somewhat tardily, to repeat the operation a second and even a third time, before total disappearance of the swelling is observed.

This plan of treatment has been found very generally successful in this hospital, and its advantages over the almost stereotyped one of "opening a bubo" with the knife during the suppurative stage, are, that it does not produce any intractable sinuses, or open ulcers, which often lay the patient up for months before an actual cure is effected; nor does it leave any ugly cicatrices after the healing process is completed.

I trust the above is sufficiently novel and interesting to warrant its publication in the *Madras Monthly Journal of Medical Science.* I have been induced to send this for publication with the view, simply, of giving the practice of treating inguinal glandular swellings, as obtaining in the 2 24th Regimental hospital, a more extensive trial.

ART. XIII.—*A Rejoinder to Dr. Macnamara's Defence of his Scheme of Water Analysis.* By EDWARD NICHOLSON, F. C. S., Assistant Surgeon, R. A., Analyst of Waters, Mysore, Northern and Ceded Districts.

SUCH very important issues depend on the settlement of the question I have raised as to the value of Dr. Macnamara's scheme of water analysis, that I need hardly apologize for taking up the space of the Journal with a rejoinder to his defence. The Bengal reports of water analysis represent an outlay of considerably over a lac of rupees, and it is of some public as well as scientific interest to know whether it is likely that further outlay under this head will be wasted as before, or whether there is any chance of its being judiciously expended.

The facts of the case are, that Dr. Macnamara was entrusted with the superintendence of the Bengal system of water analysis, carried out after his own scheme; this went on for four years, perhaps for more, during three years of which time it was under Dr. Macnamara's direction. During his absence at home he recast his scheme as far as the chemical

part of it, availing himself of the suggestions of English sanitary authorities, and he has caused it to be imposed on all Indian analysts. Certain processes are laid down, being considered those best suited for the "dâk bungalow or spare barrack room," and they are consequently enforced by the executive authorities. "The aim of the compilation is to serve as a guide to the detection of danger in the special form of contaminated or impure water."

My case against Dr. Macnamara's scheme is this. That if the first scheme was bad, and the deductions from it erroneous and often mischievous, it had the redeeming quality of simply ignoring chemistry. Its defects were patent. But the present scheme, while equally devoid of any traces of chemical experience in the compilation, is of a highly pretentious character and might easily impose upon persons not practically acquainted with chemistry. It is a patchwork of book processes, and I look in vain for any traces of the experience one would expect in a scheme compiled after three years' superintendence of Indian water analysis. I brought forward evidence in support of my assertions. Dr. Macnamara's defence may be brought under three heads:—

1*st.*—That he is not solely responsible for the scheme.

2*nd.*—That the processes he gave are sound, but he owns to having compiled them principally from text-books of analysis, and to having omitted to verify by experiment their exactitude and their applicability to the circumstances of Indian water analysis.

3*rd.*—He disclaims responsibility for the condemnation of the Hurripore and Meean Meer waters, it having been passed by his substitute.

I shall not open any new ground, but confine myself to the above points, only giving on the third point such evidence as will show that the condemnation of the above water was strictly in accordance with Dr. Macnamara's principles.

1*st.*—As to the responsibility of Dr. Macnamara for the scheme it cannot be for a moment allowed that, the scheme having been submitted to Drs. Parkes and Angus Smith, he, its originator, is absolved from responsibility. In default of any evidence as to the extent of the criticisms and suggestions he received from those gentlemen, it may be assumed that they would take a good deal for granted in a scheme originated by the Chemical Examiner to the

Government of India after three years' superintendence of Indian water analysis. However this may be, the scheme appeared under Dr. Macnamara's name, and he is clearly responsible for it.

2nd.—Regarding the chemistry of the scheme, Dr. Macnamara retorts that the charges of want of practical experience must recoil on my own head. I am so little afraid of this, that I will add not a word to what I have already said, and will content myself with rebutting by a few facts his quotations of authorities on the process for the determination of alkalies. Dr. Macnamara has agreed that his scheme shall stand or fall by the truth or otherwise of his statement, and I hold him to his agreement. If I were wrong I would openly renounce calling myself a chemist. I expect that Dr. Macnamara on receiving proof that he is wrong will renounce his scheme in the fullest sense. The statement may be thus taken in Dr. Macnamara's own words (page 426): "But if the alkaline sulphates are present in only small amount, this conversion [into chlorides] may be more conveniently brought about by the addition of chloride of ammonium to the solution, for on evaporation and subsequent ignition, the ammonium carries off the sulphuric acid, leaving the chlorine in combination as chloride of sodium or of potassium."

This is the statement which Dr. Macnamara maintains. I will proceed to prove it unfounded in fact. Authorities are of no account in questions of fact; an error occurring in one text-book is often copied unto another, as the compilers of such comprehensive manuals cannot personally verify every one amongst the large number of processes mentioned as available.

It must be remembered that the question is not whether some chloride is or is not formed, whether in an experiment I shall or shall not "find in the residue abundance of chloride of sodium," the question is whether what can be fairly called a small amount of sulphuric acid can be expelled (that is to say, totally or nearly totally expelled) by ignition with chloride of ammonium. I am free to own that a certain minute proportion of chloride is formed—a proportion so minute that, operating on small amounts of salts, the trace observed is undeterminable, and it is only by taking comparatively large quantities that I was able to determine the amount. It never exceeds 3 per 1,000 of the sulphate operated on, and repeated ignitions (operating five times

successively with large excess of ammonium chloride and a sufficient amount of water) failed to produce 1 per cent. of change. The reasons why this occurs and why the proportion must always be minute, I cannot here enter into. Suffice it to say that my counter-statement that no chloride is formed requires to be modified to the extent of 3 in 1000; complete accuracy being represented by 1,000, my statement was accurate to the extent of 997 parts out of 1,000.

But this is not the real point. If 10 or even 50 per cent. of sulphuric acid were expelled, Dr. Macnamara's statement would still be wrong; the sulphuric acid must be *carried off, i. e.,* at least 90 or 95 per cent. of it expelled and replaced by chlorine. The following experiments are conclusive on this point.

(*a.*)—*Experiment with pure salts.*—0·0324 grm. of pure sodium sulphate was mixed with 0·0500 grm. of pure sodium chloride (to assimilate the experiment to the actual process on the mixture of alkaline salts obtained in operating on a water containing a small amount of sulphates). To this mixture we added 0·0840 grm. (more than the proportion advised by Dr. Macnamara) of pure ammonium chloride. and a sufficiency of distilled water for perfect solution. The residue obtained by evaporation on the water-bath was ignited and dissolved in water; the sulphuric acid was determined in it and in an equal quantity of the original sulphate. The results were—

Original sulphate............	0·0222 grm.
Residue of experiment......	0·0221 „
Theory............................	0 0219 „

Showing that there was practically no loss of sulphuric acid, the deviations from the theoretical amount being in both cases well within the limits of allowable error.

(*b.*) *Experiment on a water.*—I selected amongst the waters of Waltair that which contained the least amount of sulphates; the actual amount being also what may be fairly called small, and I operated on a small quantity of water, 453 c. c., so as to have as little sulphuric acid as possible to expel. The extraction of the alkaline salts was conducted in strict accordance with the spirit of the process indicated. The residue of what should have been alkaline chlorides amounted to 0·1114 grm. per litre, of which 0·0157 grm. was silica; the soluble portion gave 0·0123 grm. of sulphuric acid. In an equal amount of the water I determined the sulphuric acid originally existing, strictly in accordance

with the scheme; the amount was 0·0112 grm. per litre, showing that the sulphuric acid was not expelled by the ignition with ammonium chloride. It had apparently somewhat increased; this is explained by the process for the sulphuric acid yielding an amount rather too low, owing to barium sulphate being not altogether insoluble, and some being held in solution when sulphuric acid is precipitated in an unconcentrated water as ordered in the scheme. The amount of sulphuric acid to be expelled by ignition with ammonium chloride was only five milligrammes, yet so far from its being expelled, I was actually able to determine it more accurately in the ignited residue than in the 453 c. c. of unconcentrated water.

3rd.—I assert that the Bengal water analyses and the results deduced from them by their superintendent inspire profound distrust of his capacity for dealing both with the chemical and hygienic aspects of water analysis. They also are fatal to any assertion that medical officers are qualified by a zealous pursuit of the Netley course of Hygiene, for undertaking analyses of waters.

If there is one branch of hygienic examination more insisted on, or more patiently taught than another at the Army Medical School, it is the examination of water by means of the soap test. Without entering into the principles of the soap test, I will only remind my readers that every degree of permanent hardness means somewhat more than one grain of earthy 'soluble' salts (magnesium or calcium chlorides, sulphates, nitrates, &c.), whilst each degree of removable hardness means about one grain of 'insoluble' earthy salts (calcium and magnesium carbonates and silicates). It will be sufficiently accurate to say that each grain of insoluble earthy salts (after deduction of any silica) represents one degree of *removable* hardness, and more, often much more, than one degree of *total* hardness, as this is the hardness of the 'insoluble' earthy salts, of any 'soluble' earthy salts, and of the free carbonic acid present.

Now one of the most peculiar things about the Bengal analyses is the general inability of all the analysts but one to rise above the figure 9 in the soap test. Waters may contain 20 or 30 grs. per gallon of 'insoluble' earthy insoluble salts, to say nothing of 'soluble' earthy salts, yet before the soap test marks 10 degrees it appears to break down. Lest it should be thought that this is the work of "some bungler," I may mention that Dr. Macnamara himself ap-

pears to be equally weak in the soap test and to have wasted his soap as freely as any of the analysts. There are not many of his analyses complete. I have, however, found a page of them in the fourth volume of reports, and I extract from it the following figures—every analysis in which the degrees are given being set down.

Total hardness, degrees	5·2	6 1	9·8	5·4	4·2	1·8	4·1	6·8	5·4	1·9	3·4
Insoluble earthy salts, grains ...	6·0	29·0	14·5	6·0	5·95	2·0	3·5	17·1	14·0	2·4	4·6

(Silica was 'traces' or none throughout.)

The figures speak for themselves.

Of the few amongst these analyses that are complete, I quote two *in extenso* with the remarks.

	Well in the Fort near Chowringee Gate Road.	Well in the Fort near the Treasury Gate.
Physical properties ...	Good	Good
Reaction	Alkaline.	Alkaline.
Total hardness, degrees ...	6·1	9·8
Permanent do ...	4·6	1·8
Removable do ...	1·5	8·0
Grains of oxygen required for organic matter of 1,000 grs.	·00019	.000125
Ammonia	...	Present.
Nitric acid, grs. per gallon...	2·0	1·0
Total solids do ...	67·6	38·0
Volatile matters do ...	1·6	1·5
Mineral do do ...	66·0	3·65
Earthy salts, &c., insoluble, grs. per gallon ..	29·0	14·5
Lime calculated as carb., grs. per gallon	18·0*	10·0†
Silica, grs. per gallon ...	Traces.	Traces.
Soluble salts do ...	37·0	22·0
Chloride of sodium do ...	20·5	12·5
Sulphate of soda do ...	5·5	·3·6
Carbonate of soda do ...	Not determined.	...

* 18 grs. of calcium carbonate get only 1·5 degree of removable hardness.
† 10 grs. of calcium carbonate gave 8 degrees removable hardness.

Remarks (page 29 of Report.)

Well in the Fort near Chowringhee Gate Road.—It is a properly constructed well, having an efficient parapet, platform and drain; it is 41 feet deep and contains about 6 feet of water. The water is used by the sepoys and camp followers, but not nearly so much as formerly, for with few exceptions, the men greatly prefer the water from the neighbouring stand-pipe. Forty-eight feet from the well is a bazaar and the sepoys' quarters are close at hand; no doubt their neighbourhood and the constant washing that goes on, not only of bodies but of cooking utensils, in the vicinity of the well, is the reason of the impurity of the water. The water contains 67·6 grains per gallon of solid matters, including 20·5 grains of common salt. The sepoys consider the water to be of good quality.

Well in the Fort near the Treasury Gate.—This well is also properly constructed; it is 29 feet deep and contains about 4 feet of water. The well is now chiefly used for ablutionary purposes and only to a slight extent as a drinking water. There is no bazaar or other permanent source of pollution in the neighbourhood of the well, yet the water contains a rather large amount, 38 grains to the gallon, of solid constituents. including 12·5 grains of common salt. No doubt much of the saline matter in the well is derived from the washings of sepoys' bodies and cooking utensils. This water is considered by the sepoys very good.

Let us now examine how far the analysis justifies Dr. Macnamara's conclusions. Let us take the second well; the criticism is the same on both. There is a water condemned as containing the saline matter from men's bodies and from cooking utensils; how far does the examination of the water justify these assertions? *There is not an atom of evidence to justify the assertion.* The water is, to a very slight extent, brackish; the presence of sulphates in ample proportion to the chlorides is good evidence of the latter being caused by a slight admixture of marine salts with a naturally pure water; the amount of organic matter as measured by the permanganate test is about the minimum; the quantity of nitric acid much less than usual in Indian subsoil waters; the presence of ammonia is a trivial circumstance (the first well contained none). There is no possible source of sewage contamination near.

But Dr. Macnamara with two years' experience of Indian water analysis, still laboured under the idea that nitric acid is always a product of animal pollution and that an excess of chloride is owing to the same cause. He finds a small amount of nitric acid and an excess of chloride, and at once jumps to the conclusion that the wells are contaminated by human and kitchen refuse. He has before him the fact that there is no possible source of sewage pollution in the neighbourhood, that the well is of good construction so as to keep out direct surface infiltrations, that the physical properties of the water are good, that the amount of organic matter is nearly the minimum possible, that the proportion of sulphates accompanying the chlorides is as nearly as possible that occurring in sea-water; but he has no eyes for these facts; he sees nothing but nitric acid and the chlorides, and the well is condemned. A pretext is, of course, required; it is readily found. A sepoy not far off is perhaps washing his brass vessels or even throwing a pot of water over himself; accordingly "no doubt that much of the saline matter in the well is derived from the sepoys' bodies and cooking utensils."

The fact is that Dr. Macnamara then as now took his chemistry and his hygiene out of an English book. He had seen it stated that in England nitrates when existing in any quantity are generally the oxidized products of sewage contamination; he did not reflect that, possibly in India, the great producing country of nitre, the occurrence of nitrates in waters may be quite normal; he did not think of ascertaining by experiment whether such might not be the fact, but he bows at once to "the authorities" and condemns every Indian water that happens to have nitric acid in it. Speaking of the excellent spring water of Murree (page 32 of same report) he says, "the springs being fed by the surface drainage which sinks into the subsoil of the hill, of course a considerable amount of sewage matter mixes with the water, and becoming oxidized, is represented by the nitric acid which is present in it." These waters, of most excellent quality, happen to contain a small amount of nitric acid, estimated at one grain per gallon; accordingly they are declared to be polluted by oxidized sewage.

Such mistakes might be excused in a beginner just out from England, imbued with the 'previous sewage contamination' theory; but to find them perpetrated by the superintendent of two years' systematic analysis is too bad. Dr. Macnamara

might have been expected to learn something by experience during his campaign against the potable waters of Bengal; he appears to have learnt nothing. With a blind reverence for "the authorities," he made not the slightest use of the splendid opportunities before him; with unquestioning faith in home theoretical views, facts seem not to have existed for him; with an apparent incapacity for appreciating what is evidence, he condemned good waters wholesale. He now publishes a scheme which shall "aid professional chemists who might be employed in analyzing waters in India" and "serve as a guide to the detection of danger in the special form of contaminated or impure water."

In conclusion I cannot but express my regret at having to speak strongly on this subject, but any milder criticism might have served as an excuse for amendments in a scheme fundamentally bad. I render every justice to Dr. Macnamara's labours in the superintendence and compilation of the Bengal analysis; had his zeal been well directed, most valuable results would certainly have been obtained.

ART. XIV.—*A Case of Enteric Fever.* By Assistant Apothecary H. Judge.

August 8th, 1869.—Peter John C———, Æt. 19, service 1 year and 8 months, European of H. M.———Foot, an ordinary built man, of bilious temperament, was admitted into hospital on the 7th instant, suffering from fever of four days' duration. The attack was ushered in by rigors, and a general sense of chilliness, alternating with flushing of the face and heat of skin. This was quickly followed by pain in the head, loss of appetite, great thirst and spontaneous diarrhœa; dejections bilious.

Appears this morning somewhat prostrated and inclined to be drowsy. Skin of a pungent heat; pulse full and quick; tongue foul and dry. Complains of tenderness on pressure over the left iliac region, and there is also some irritability of stomach present.

℞. Quiniæ Sulphatis gr. viii.
Liq. Am. Acetatis : ℥ i.
Pot. Nitratis gr. xxxii.
Sp. Am. Nit. ʒ iss.
Aquæ Camphoræ ad. ℥ vi. *M.*

Ft. Mist.

A fourth part every three hours.

P. Ipecac. Co. gr. x. h. s.s.

Body to be sponged with tepid water. Blister to nape.

Beef-tea diet.

Two pints lime-juice.

9th.—Diarrhœa severe during the night and some hæmorrhage from the nose occurred. Complains of soreness in the head; pulse not so strong; tongue brown and dry; is inclined to eat a little.

Cont. mixture.

℞ Cupri Sulphatis
Ex. Opii. āā ¼ gr.
Ex. Gentianæ q. s.
M. Ft. pil. i.

Four times during the day.

Beef-tea diet.
Beef-tea 1 pint extra.
Milk 1 pint.
Eggs 4.
Port-wine 6 oz.

Vespere.—Great tenderness over the whole abdomen. Diarrhœa less.

Turpentine stupes.

P. Ipecac. Co. gr. x. h. s.s.

10th.—Expresses himself as being 'about the same way.' Slept well during the night. Diarrhœa still persists, and the evacuations have assumed the characteristic ochre colour. Tongue becoming browner, though clean and red at the tip and edges; pulse still vigorous; fever continues; a few rose-coloured spots are visible on the abdomen. 8th day of disease.

℞ T. Kino ʒ iss.
T. Catechu ʒ iss.
Acidi Gallici gr. xv.
Aq. Cinnamomi ℥ iii. *M.*
Ft. Mist.

A third part three times a day.

℞ M. Diaphoretic ℥ i.

Three times a day, during the intervals.

Tepid sponging. Port-wine 8 oz.

Cont. same diet.

11*th.*—Was wakeful during the greater part of last night, and is a little wandering in mind this morning. Pulse feeble, quick; tongue becoming darker and drier with incrustation of sordes on lips and teeth. Diarrhœa continues. A fresh crop of spots have appeared on the abdomen, and a few on the upper extremities.

Cont. Astringent Mix.

Lime water to be added to milk, 1 to 4 parts.

Abdomen to be covered completely with spongio-piline wrung out of warm water.

Diet same, with extras.

12*th.*—States he feels very bad this morning. Had short snatches of sleep during the night, waking up at intervals and getting out of bed; diarrhœa yielding; motions of a darker colour; takes his food and wine well; tongue still brown and dry; skin not so hot; pulse good. Epistaxis occurred again yester afternoon, but not to any extent.

Cont. Med. and Diet.

13*th.*—Looks better this morning; slept tolerably well during the night; appetite not so good as previous days; pulse fuller and slower; skin much reduced in temperature, and tongue smooth and moist. Irritability of stomach set in again yesterday and still continues. A recurrence of epistaxis yesterday.

Cont. omnia.

14*th.*—States he feels better; apparently improving; slept well; no delirium; bowels moved only once. A fresh crop of spots seen over left hypochondrium. There was a marked exacerbation of the fever last evening with a remission of the symptoms this morning. Still some tenderness over the abdomen; tongue moist and not so brown.

Cont. nourishment as before.

Three drops of Dil. Hydrocy. Acid for a dose in mucilage when sickness of stomach occurs.

15*th.*—Very restless during the night; moaned a good deal; expression of countenance this morning very vague; eruption well marked on thorax; bowels moved thrice last night, motions still yellowish and fluid; tongue cleaning; pulse slow but moderately full. Great anorexia present, but stomach not so irritable.

Resume astring. mix.

Aq. Calcis with milk.

16th.—Passed a very restless night. Refuses nourishment of every kind, and is emaciating in consequence. Pulse keeps good; tongue moist, cleaning; eruption fading.

Cont. Om.

P. Ipecac. Co. gr. x. h. s.s.

17th.—Feels much refreshed this morning after a good night's rest, and expresses himself a deal better. Speaks quite rationally. Skin acting well. Emaciation progressing; tongue dry but clean; sordes have disappeared, and there is now no tenderness whatever over abdomen.

Cont. Dover's powder at bed-time.

18th.—Progressing favourably; slept poorly last night but very well during the day; skin warm; tongue clean; pulse fuller and slower, appetite variable; fever declining.

Cont. as before.

Brandy 3 oz.
Soda water 2 bottles.

19th.—Doing well; takes his food better, and is gaining strength; pulse good; skin cool; no diarrhœa.

Cont.

2*0th.*—Improving daily; appetite returning; tongue keeping clean and moist; eruption has quite faded on the abdomen those on the chest still visible, though of faint colour; countenance more natural and becoming more solicitous as to his state.

Nil.

21st.—Had a good night's rest, and looks very well this morning. No fever; bowels rather sluggish; eruption has nearly quite disappeared; a few spots only remaining visible on the chest; tongue clean; skin natural; pulse good.

℞ Ol. Ricini. ℥ss.
T. Rhei Co. ℥ i.
Aq. Cinnamomi ʒ i. *M.*
F. haust. st.

22nd.—Steadily improving; eruption scarcely perceptible; appetite better; sleeps well; bowels acting; skin cool. Complains this morning of severe pain in the left knee-joint, which presents nothing however abnormal to call for direct treatment.

Flannel roller to knee-joint.

23rd.—Fever has declined entirely; no eruption whatever visible; is gaining flesh; bowels regular; tongue clean and moist; sleeps fairly and appetite good.

Nil.

24th.—Passed a fair night; skin a little warm; pulse normal; motions healthy.

25th.—Patient slowly but steadily convalescing. No febrile symptoms.

Nil.

28th.—Doing favorably; gaining strength.

September 4th.—Has continued to progress favorably since last report without anything special to note.

12th.—Doing very well, and picking up flesh.

Nil.

20th.—Quite well.

Discharged.

Remarks.—Doubtless hardly one of the medical profession would read the above case without being struck at an entire absence of thermometrical observations and registrations of the pulse and respiration—data so invaluable in *diagnosis* in enteric fever. But I must apologize by stating that the omissions have arisen not from any want of pains in case-taking, or observation at the bed-side, but from the bare fact that there was no thermometer in the hospital at the time, and that in the absence of information derivable from such a source, I thought it unnecessary to detail points of *minor* importance, that is, viewed *diagnostically.* I trust, however, the case will not be uninteresting, inasmuch as it faithfully exhibits the symptoms and progress of so formidable a disease as that under review.

THE NATIVE ARMY IN 1870.

The Medical and Sanitary Report of the Native Army of Madras for 1870 is one that will repay perusal. It has, however, the universal fault of Government blue books in being not only large, but larger than there is any occasion for. It fills 125 folio pages, 120 of which consist of closely printed matter, the remaining 5 being devoted to statistics.

The main bulk is occupied by the annual reports of executive medical officers or large extracts from them. Many of these are, to use the words of one of the administrative officers, barren of interest. This being the case, one wonders why they are published. They contain nothing new. Some of these reports fill three or four pages, and even those reported to contain nothing of interest have a page and a half devoted to them. No one cares to read year after year that the huts in any given station are too small and over-crowded; that the state of the drains in the lines is most unsatisfactory, and that the smells arising therefrom are most objectionable: that each sepoy continues to have his own latrine in his own little court-yard, and that he is not at all particular in getting it cleaned out: that the water-supply is still very indifferent, and so on. Of course it is all right and proper for each Regimental Surgeon to mention these things in his annual report to his immediate superior, and the latter may consider it advisable to forward it on to the Head Medical Office, but there can be no advantage in hampering the pages of the General Medical Report of the Army with them. When there are two or more regiments in one station we have two or more

similar doses of the "climate," and "diseases of the district," and "state of the crops," and "natural features of the surrounding country," &c., &c., all in the same volume. The reader must be very patient, and must have more time at his disposal than is common in this country, who is willing to go through all this. In some of the executive reports there are Medical cases, and long accounts of malingering sepoys. We think that if these were worth printing, their proper place would be the pages of this Journal, where also they would have a better chance of being read and appreciated. Our opinion is that any new or useful information contained in the Regimental reports might very well be embodied in the Administration Reports of the Deputy Inspector Generals. We would thus have a very readable pamphlet of forty or perhaps fifty pages.

Having ventured to state what we consider to be the defects of the Report, we have much pleasure in drawing attention to some of its great merits. Chief among these are the "Diagrams to illustrate the chief meteorological phenomena and the fluctuations of the principal forms of sickness amongst Native Troops, during each month of 1870 in the stations of Madras, Bangalore, Secunderabad, and Trichinopoly." These are perfect models. By means of coloured bands and shading one sees at a glance the direction of the prevailing winds, the average height of the barometric column, the rainfall, the atmospheric humidity and the mean daily range of temperature for each month in the year. Coloured lines readily indicate the mean temperature, the general sickness and the prevalence of diarrhœa, dysentery, fever and cholera throughout the year. With so much information thus condensed there is no confusion. All is laid down with beautiful clearness. With reference to these Mr. Balfour writes that "it is purposed to continue these illustrations

from year to year in future Reports, as they will form graphic permanent records of the health and climate of head-quarter stations, and may, in course of time, throw additional light on the influence of the elements of climate singly or collectively, on health." It is almost impossible to suggest any improvement on these diagrams. A band or line indicating the velocity of the wind might perhaps be added with advantage. Seeing that the thermometer in the shade in May rises to 108° in Secunderabad, while the air is at the same time excessively dry and the rain-fall almost nil, one would be glad to see at the same time what the velocity of the wind is likely to be. A fresh breeze with cuscus tatties would make the place tolerable to live in. On comparing the different diagrams, difference of climate and disease are very obvious: for example the small mean daily range of temperature in Madras as compared with Secunderabad, and its large proportion of atmospheric humidity as compared with Trichinopoly. Turning over the pages of the Report we come to a map of Mysore showing the prevalence of cholera according to a plan adopted by the Sanitary Commissioner, the comparative prevalence of the disease in the several districts of the province being indicated both by deepening shade of colour and by figure giving the death rates per 10,000 of the estimated population. The Report of the Deputy Inspector General of the Mysore Division is well characterised by Mr. Balfour as able and interesting. The last chapter of it, headed "Regimental" contains abundant remarks on the Regiments and Regimental Hospitals under his charge. So full are they that we think the reports of the Medical Officer attached to these Hospitals, which occupy about fifteen pages, might well have been left out altogether. Referring to the vexed question of the spread of cholera Mr. Ran-

king writes that "the disease in fact moved so capriciously that it is impossible to say whether it was propagated along the main line of intercommunication or by prevailing winds." A perusal of this Report shows only too plainly that very little of any material consequence has yet been done to improve the sanitary condition of the Madras sepoy. The native lines are merely "drained by open ditches" which absorb filth and are sources of disease, and, as Mr. Ranking writes, "until drainage and sewerage of our cantonments and lines of regiments is effected by impermeable drains, it is scarcely to be expected that any material reduction will be effected in diseases of the diarrhœal type." Then there is no guarantee that the sepoy drinks sound water. He gets it as he may from uncovered wells and tanks in the neighbourhood of his lines.

The Surgeon of the Sappers and Miners in Bangalore has obtained some novel results in Vaccination. "In 108 vaccinations of sepoys who had marks of previous small-pox, 84 were successful: in 98 who had *good* marks of previous vaccination, 77 proved successful; and of 67 men who had marks both of smallpox and previous vaccination 44 were successfully re-vaccinated. These results are contrary to ordinary belief, to say the least of it, and we are glad to know that the Inspector General has ordered a repetition by others of the experiment.

On the subject of Fever there are some interesting remarks in the Report of the Deputy Inspector General at Secunderabad. He writes that the prevailing fever there appears to be due to cold and wet rather than to malaria, as it is most common after the south-west monsoon has fairly set in and the ground is soaked with rain, and it usually yields to simple emetics and salines followed by tonics, without the aid of quinine. One of his executive officers ventured, for these reasons, to

class 278 cases of fever that occurred in his Regiment under the heading Febricula. His superiors, however, replaced them under Fever, remittent and intermittent, on the ground that "no line can be drawn between them and the more regular form of ague." This is a subject that has yet to be worked out. This difficulty in naming many cases of fever occurs in other stations besides Secunderabad, Madras for example.

In 1870 the rainfall was generally above and the temperature below the average. Crops were abundant, and the sepoys had consequently plenty to eat. The strength of the army was about 31,000, of these about four-sevenths were Hindoos, three-eighths Mahomedans, and the remainder, about one-sixteenth, Christians. The health of the army was about the average. The ratio of treated to strength was 11·10 per cent. The corresponding ratio for prisoners during the year was 73·5 per cent., whilst that for European troops throughout the Presidency amounted to 148·15 per cent. The total mortality during the year was 411, or about 13 per 1,000 strength. There were very few deaths from cholera. The sickness and mortality varied within very wide limits in the different divisions in which the troops were stationed. Thus the Southern Division was the healthiest, with a ratio of sickness to strength of only 36 per cent., and a mortality of 8 per 1,000, while in Hong-Kong the percentage of sick was 138 and the mortality 30 per 1,000. "The most unhealthy command on the continent of India, in which Madras "troops were serving, was Saugor, in the Bengal "Presidency. The great seasonal and diurnal variations in temperature which obtain there have proved "very trying to the Madras sepoy, and the chief "cause of sickness in the regiment was fever of "various types. The climate of Hong-Kong is also "a trying one for Madras troops owing to malarial

" influence, as also the low winter temperature, 52°
" Fht., and the great annual fluctuations of the
" thermometer amounting to no less than 33·5° Fht.
" The diseases from which the 29th Regiment chiefly
" suffered there during 1870, were fever and bowel
" complaints. In the moist relaxing climates of Pegu,
" and the Andaman and Nicobar islands, and in the
" Straits also, the health of Madras corps rapidly
" deteriorates; dysentery, diarrhœa and rheumatism
" being the most common complaints."

FOOD IN BESIEGED PARIS.

M. Bouchardat has published in a French periodical a short paper *De l'alimentation azotée pendant le siége de Paris,* which contains some of the results of very exceptional experience in the matter of animal food. The two points to which he calls especial attention are; (1) the quantity of nitrogenous food necessary for the support of life, and (2) the modifications produced in the excretions and the flesh of animals by a radical change of diet. When the question of rationing the population arose, the author put forward the proposition that it is easier to preserve health, during a tolerably long period, under a reduced supply of nitrogenous or plastic food than when calorific aliment is diminished; this being especially true when the weather is very cold. He did not, of course, apply this principle to the case of adult males under circumstances of physical exertion, the soldiers engaged in defending the city for instance. For such men a complete dietary was enjoined. The absolute amount of azotized food, generally laid down as necessary in 24 hours for the maintenance of health, is such a quantity as contains 21 grams (324 grs.) of nitrogen. M. Bouchardat seeks to show that this quantity is unnecessarily large and that less

may be supplied for a considerable time, provided that the calorific element of the food be sufficient and properly regulated in amount. Thus 100 grams of meat in its ordinary condition contain approximately 3 grams of nitrogen. If nothing but meat is eaten, therefore, 700 grams would be necessary in 24 hours in order to supply 21 grams of nitrogen. About two kilograms of bread would be required for the same purpose; or, if the diet be mixed, 1 kilogram of bread and 350 grams of meat. Experience seems to show that nitrogenous food is in excess in such a dietary. Previous experiments had shown the possibility of a carnivorous animal's living for more than a year on food so little azotized as beef-fat with cellular tissue: and clinical experience corresponds with the conclusion thus indicated. Cases occurred in which the stomach rejected all food except milk. The patients were put upon a diet consisting exclusively of cows' milk and kept on it for two or three months, the mean daily supply being three litres. Not only did they not lose weight under this regime, but they recovered strength and condition. Now a litre of milk contains about 30 grams of nitrogenous matter (casein, albumen, &c.); and 3 litres supply only 15·5 grams of nitrogen instead of 21. "During the siege we were reduced to a ration of 60 grams and subsequently to 30 grams of horse-flesh; I confess we lost a few kilograms in weight, but the health of vigorous persons not exposed to other privations (especially cold) was unaffected."

If the proportion of albuminate necessary for the daily food be calculated from the amount of nitrogenous excretions, it will appear that the quantity of the latter may be diminished considerably by changes in the food without injury to health. In Paris a man in health, suitably fed, excretes between 25 and 30 grams of urea in 24 hours. The urine of

several persons who had come to Paris from tropical climates (Brazil, Java,&c.) was examined and yielded no more than 15 grams the quantity sometimes being so low as 12 : the diet corresponding to these amounts, and the foreigner being in good health. After from four to six months' residence in Paris the proportion of urea rose. These facts clearly show that the amount of nitrogenous food daily taken may be diminished without ill effect. The author has also arrived at the conclusion that many men who are in the decline of their vigor ought to reduce the amount of albuminate food when not engaged in severe physical work and when the respiratory movements are becoming languid, so that the volume of air passing through the lungs is sensibly diminished. Under such circumstances the abuse of nitrogenous aliment gives rise to numerous diseases. Digestion is disturbed. The breath becomes offensive and many chronic affections of the digestive organs are set up or slowly aggravated. If digested and absorbed, the nitrogenous matter, when excessive, forms unhealthy products in the blood and in the organs, sodium urate and calcium oxalate for instance, in larger quantities than can be eliminated; whence gout, gravel and calculus result. Grave cerebral affections, apoplexy, hemiplegia, softening of the brain, are rare among the sober peasantry, who have not given up severe agricultural labor in their maturity or in their declining years. These diseases are unknown amongst the monks of La Trappe who are vegetarians. These facts shew that excess of nitrogenous food is a probable predisposing cause of cerebral hœmorrhages. The surest means of producing emboli in the minuter ramifications of the cerebral vessels is to favor the genesis of insoluble compounds in the blood, which the kidneys and other excretory organs are unable to eliminate. In practice patients threatened or at-

tacked with cerebral congestions should diminish the ingestion of nitrogenous food; and in such circumstances the frequent use of purgatives is indicated and practised on the same principle. Although, however, there is good reason to attribute serious consequences to the abuse of albuminate food by elderly and old persons, it is not to be supposed that young men, growing or working hard, should practise such abstinence in this respect as the exigencies of the siege compelled Parisians to undergo.

As regards the second point, some remarkable observations were made upon the modifications of which the flesh of carnivorous or omnivorous animals admits when deprived for some time of animal food and converted into granivora. The urine of a rabbit, fed for eight days on gluten bread exclusively, was completely changed in character, having become in color, odor, density, acid reaction and abundance of urea, identical with lion's urine analysed by Vauquelin. On several occasions both in Paris and in Algeria the attempt was made to feed pigs with flesh from the knackers' yards. Slaughtered after having had no other food for some time, the fat was anything but agreeable to the taste, the oleine predominating in it; the flesh was little better, was in fact disgusting. The speculation had to be given up or modified by adding a large proportion of potatoes to the meat. It was attempted to feed fowls with similar meat, or with worms, maggots, and the pupæ of silkworms; but it was found that the flavor of their eggs "laissait beaucoup á desirer," and their flesh was far from appetizing. A mixed diet, not one exclusively animal, was necessary to render either eggs or flesh agreeable. The Montfaucon rats, whose food had been dead horses,&c. (until these became useful to their betters,) gave off an offensive odor when they were caught, of

which their muscles and all other parts partook. Lasseigne found in them calculi of oxalate of calcium, undoubtedly due to the transformation of uric acid into urea and oxalic acid. During the siege most of the domestic carnivora—cats and dogs—were fed, in consequence of the scarcity of more suitable substances, upon a diet approximating closely to that of granivora. Like their masters they had to put up with soup made with oil and siege-bread. The rats, too, had nothing but vegetable products to eat, all bones and other animal refuse being carefully collected and utilized. The results of this change of diet were that the urine lost its characteristic odor and their flesh, in taste and appearance, came to be like that of the animals ordinarily used for food. "How many women habitually fastidious accepted, instead of legs of mutton, legs of big bull dogs, and tom-cats of the gutter for choice rabbit! Rat-flesh was unsurpassable, and careful cooking rendered fear of trichinæ chimerical."

HAMMOCKS ON MARCH.

In a country like India, where the distinctions between races and religions are so marked and numerous, the maxim that the British Government holds this country "by the sword." is one which has numerous adherents and which, in our opinion, cannot be gainsaid. Such being the case, therefore, it is but natural that the Government should use their best endeavours to maintain the agents whereby their power is thus upheld in the land, in a condition of thorough efficiency and serviceableness; to provide that the meat and drink dispensed to them be of an unadulterated and nourishing description; and to see that the shelter afforded them against the adverse agencies of extreme heat or cold, damp

and malaria, be such as the most approved laws of hygiene require for the soldier in garrison. These requirements have of late years more particularly attracted the attention of the controlling authorities, and to this fact the present excellent system of our Commissariat arrangements, and the lofty, well-ventilated and cool barracks that have been constructed and are now under construction at our principal military stations bear testimony. From the latter, however, it must be understood that we except, *in toto*, the paltry structures lately run up at Allahabad, Jubbulpoor &c., and that we refer solely to such as have seen the light of day and withstood the brunt of the monsoons at stations such as Bellary, Bangalore, Trichinopoly and Cannanore. But whilst the soldier in garrison is thus well cared for in every particular, the arrangements that obtain for providing him with suitable shelter whilst on the line of march are, in our opinion, capable of vast improvement. In the matter of food and drink, our Commissariat Department is generally equal to the calls made upon it; but when the wearied soldier, at the close of his march and labours for the day, throws himself down to rest and recruit his frame for the succeeding day's exertions, he might find a more comfortable and invigorating resting place than that at present provided for him by the orders of the Government whose authority and power he but lives to uphold.

Our attention has been more particularly drawn to this subject by meeting with a Government General Order of July 1871, to the effect that "if the ground on the line of march cannot be made sufficiently smooth, or if the ground be unavoidably damp, the Commanding Officer is allowed to issue, on certificate from the Medical Officer, an extra quantity of straw per day for bedding to each European soldier." From this it would appear that a little straw is always allowed, with the soldier's blanket or greatcoat over

it, as a bed; but apart from its vermin-harbouring and perishable nature, why we ask should such a bulky, and, in very many districts, expensive Commissariat article be used at all for this purpose? And why again should the Medical officer be hauled in to give evidence as to whether the ground is sufficiently damp to need this extra dole of straw? Are his senses of smell and feeling supposed to have been cultivated to a pitch beyond that of the Commanding officer or the Quarter-master attached to the Regiment? The straw that forms under the present system the interposing medium between the body of the soldier and the ground might, we consider, be altogether dispensed with for all the material good it effects. The very fact of lying on the ground is one that militates against the enjoyment of a thorough and satisfactory rest; and in countries, such as Rajpootana and Central India, Bellary and Cuddapah, where the sun's rays act with fearful intensity upon a volcanic soil, we feel convinced that no benefit can result from placing the wearied human frame in juxta-position with the ground. This much at least we can assert, after learning of the experience of those who have tried it, that instead of rising refreshed from a night bivouac upon the bare ground, an additional feeling of langour, coupled with a disinclination for mental or physical exertion, is the invariable consequence. Starting with these premises, therefore, it seems to us a natural deduction that the human body should, when in a state of repose, rest upon a comfortable and yielding material placed at a slight elevation above the ground surface. The American Indian in his forests, the untutored inhabitant of the Hill Ranges in Southern India, the bushranger in the backwoods of Australia, and even in the plains of some malarial districts of this country, the hardy ryots themselves, put into practice what we are now endeavouring to

advocate on behalf of the European soldier. The ordinary trestle-cot, apart from the limited accommodation afforded by the usual pattern of tent, would be, from its bulk and weight alone, unsuited as an article of camp equipage, whilst on the other hand, the sailor's ordinary canvass hammock would form an excellent substitute and fulfil at the same time the requirements of a satisfactory and comfortable resting-place for the tired soldier. The manner in which the men occupying each tent would lie, should be exactly similar to that now adopted, viz., with their feet to the pole and heads towards the circumference of the tent. At an elevation of twenty inches above the foot of the pole an iron band encircling it, and provided with hooks corresponding in number to that of the men allotted to occupy the tent should be fixed. To these hooks one end of each hammock should be attached, whilst the other end should be fixed to the iron peg employed for McGwire's muster of hammock, and belayed in similar manner. When the tent is struck, the hammocks are to be drawn up through a pully arangement at the top of the pole, so as to lie up close against the latter, and over this may come the usual gunny bag covering. On pitching the tent, the hammocks would be once again let down, the pegs at their heads driven in and the tent ready for occupation. The diameter of the tent to be provided with these hammocks should be at least 14 feet. We commend these suggestions to the earnest attention of the authorities, relating as they do more particularly to the well-being and comfort of our soldiers at a time when they are more liable to fall sick, and thereby entail additional labour and anxiety upon those who have the immediate care of them.

RELATIVE RANK.

We print in our Medical Intelligence, as a small contribution towards the improvement of the Official Army List, a specimen of what a Gradation List ought to be. We never were, ourselves, particularly sensitive on the score of relative military rank or ambitious of that advancement in the military hierarchy which was, some years ago, conferred upon us, with a considerable flourish of trumpets: but as the thing is there we do not see why it should be ignored unless when it is prominently thrust under the "combatant" nose. In these piping times of peace, when batta and prize-money are dreams of the past, the substantial advantages of military rank in the case of medical officers are confined to Presidency house-rent while we are alive and Clive's Fund for our mourning widows. The former point is now tolerably well settled, but we have known two occasions on which surgeons' widows received subalterns' rate from Clive's Fund and one in which the error was corrected with extreme difficulty and many shuffling references between England and India, in consequence of the incapacity or unwillingness of the purely military mind to recognize the scale of rank laid down by the Warrant. In social matters we fear the weaker and more sensitive of our brethren must often have their tender withers wrung by the systematic trampling upon their guaranteed rights of precedence which they have to endure. It *is* galling to a dashing Surgeon-Major, conscious of no mean conversational powers and anxious to impress them on a gentle listener, to see the scanty supply of the fairer sex which Indian dinner-parties so often show told off to majors and captains and sucking civilians, while he is left unmated in the rear! Over

such suffering as this, alas! so common, we prefer to draw a veil.

Now in the Madras Army List "published by authority," there has not been until within the last few months the faintest trace of the fact that medical officers are military officers with definite military rank. The innovation consists in stating, at the head of each sub-division of the Medical Establishment, the relative rank to which it corresponds; and even this will, no doubt, prevent future trouble in such matters as the pensions from Clive's Fund. We find a "Gradation List of the Bengal, Madras, and Bombay Armies," a "Gradation List of Officers on the Madras Establishment," a "List of Retired Officers of the Madras Presidency above the rank of Captain." Medical officers are "Officers," but we look in vain for any of their names in any of these Lists. But in another List of Retired Officers the absurdity reaches the climax of grotesqueness. Here retired medical officers, many of whom rank as Brigadier-Generals, and scarcely one of whom is below a Major, are arranged alphabetically in a list of Captains and Subalterns!

Our humble Gradation List is only offered as a hint to the combatant compilers of Army Lists. It does not profess to be complete, even for officers of the rank of major, our brethren of the British Medical Service not being included: but it shows, as we conceive, what Gradation Lists of military officers ought to be.

DR. HOOKER AND MR. AYRTON.

"Hyperion to a satyr" is the quotation which the juxta-position of these names suggests. We have been favored with a perusal of the indignant protest forwarded to Mr. Gladstone by the leaders

of Physical Science in England. It is a very plain-spoken and yet temperate paper, and, making every allowance for its being an *ex parte* statement of the case, it displays an amount of arrogant insolence and contempt for scientific reputation on the part of the First Commissioner of Works, eminently characteristic of the gentleman who began his official career with a public sneer at "sculptors, architects and gardeners." We trust that the issue of a contest between Mr. Ayrton, backed by the generous but necessarily half-hearted support of Mr. Gladstone (whose tolerance of his subordinate is a psychological curiosity), on the one side, and Dr. Hooker, supported by the sympathy of every student of Nature and of almost every educated person in the civilized world, on the other, cannot be doubtful. The viper in the fable found that he was biting a file and desisted; let us hope that Mr. Ayrton will find a "gardener" a harder subject than an "architect." At the worst the scientific world would not lose Dr. Hooker; but his separation from Kew, which he and his father have made what it is, would be more than a merely national calamity. Better even to lose Mr. Ayrton from the Ministry.

REVIEW

On Antisepticity in Surgery. [By EDWARD LUND, F.R.C.S., Lecturer on Anatomy, and one of the Surgeons to the Manchester Royal Infirmary.

Mr. Lund has presented us in this pamphlet with a *bróchure* on the antiseptic treatment of Wounds, Abscesses and Ulcers. Starting with the motto "Keep the wound clean," he proceeds to discuss the very pertinent query, "Cui bono pus?" This pus he rightly regards as useless and injurious, because the result of putrefactive changes in the fluid exuded, in the reparative efforts of Nature, on the surfaces of all solutions of continuity. "This fluid matter," he says, "together with other secretions from such surfaces, might be styled the excreta of wounds, as serving no useful purpose in the animal economy, and as being waste unused material thrown off from the body." But we demur to the pathology of the writer. We cannot consider the term *excreta* as at all appropriate or applicable to the fluid in question and are far from believing that it serves "no useful purpose in the animal economy.' On the surface of a wound in a healthy body, when this wound is carefully treated on sound surgical principles, the exuded lymph should, in quantity and quality, suffice for the repair of the wound; and, only in those cases will the quality fail and the quantity prove excessive, when the body is unhealthy, or placed in unhygienic conditions, or the local antiseptic treatment has been defective. Again, in a subsequent page, in allusion to the formation of pus, Mr. Lund writes, "when once the vessels of any part have taken upon themselves the secretion of pus, it is most difficult, if not impossible, to control their action and to stop its further production." Here also our pathological views are at variance with those of our author. We cannot regard pus as a secretion of the vessels of any part, simply because these tubes have no secreting power.

But while taking exception to some of the pathological doctrines of the author, we hail his accession to the ranks

of those who testify to the value of Professor Lister's Antiseptic treatment. This treatment, we believe, to be one of the most valuable contributions of later days to conservative Surgery, and the experience of Indian Surgeons verifies and corroborates all that has been urged in its favor by Surgeons in the United Kingdom. Besides promoting the normal repair of wounds and ulcers, the carbolic acid treatment, as prescribed by Mr. Lister, secures a much more pure and pleasant atmosphere in surgical wards, and we were never more struck with this fact than two years ago when visiting the wards of the Clinical Professor and those of his surgical colleagues in the Edinburgh infirmary. The former presented a striking and favorable contrast to the latter in the odors which pervaded them.

In conclusion, we would, however, sound one note of caution as to the use of carbolic acid. The proclivity of the natives of this country to tetanus renders it necessary that, in cases of lacerated wounds, the solution of acid should be as weak as possible, and certainly not above one part of the acid to sixty of water.

MEDICAL MISCELLANY.

The Treatment of Enteric or Typhoid Fever. By JAMES LITTLE, M. D., Univ. Edin., M. R. I. A.; one of the Physicians to the Adelaide Hospital.

During the past three weeks an unusually large number of persons suffering from enteric or typhoid fever have presented themselves at the Adelaide Hospital, they have not come from any single neighbourhood but from various localities in and around Dublin. I therefore think the disease just now prevails somewhat extensively, and I am anxious to draw attention to its treatment, because even the last editions of the standard text-books do not, in my opinion, tell all that in the present state of our art we can do for the disease. In one important matter, as I conceive, the advice given in all of them is injudicious, a valuable means of treatment is not mentioned at all and the indications for the employment of exceptional measures are not stated with sufficient precision. Several of those I adopt are, I know, daily prescribed by other physicians in this city, and most of them I have copied from the practice or tried on the recommendation of some one else; but the opinions I now express regarding them are founded on their observed effects in my own cases, and the justification of my present description of them arises from the circumstance that they are not generally known, or, as I believe, sufficiently valued.

Next to early confinement to bed, which perhaps more than anything else lessens the severity and risk of the fever, I rank the rigid exclusion of animal broths and jellies from the food, as tending to keep the disease mild. On this point I find myself quite at variance with the text-books in which such articles as beef-tea and Liebeg's essence of meat are recommended. Dr. Hudson in his Lectures on Fever insists on the liability of all kinds of broths to increase the diarrhœa, and I cannot but attach the utmost importance to this matter, as I have repeatedly seen a patient who was passing four to six stools on a milk diet have eighteen or twenty during the day and night after he had taken beef-tea. Milk should be the chief article of diet in enteric fever. Thirsty patients sometimes object to its mawkish taste, and I generally, therefore, add ice to it, and a little lime water in cases in which it returns curdled. Junket or rennetted milk given before it has separated into whey and curd, rice milk,

custard, baked custard in small quantity, rusks and hot milk, and blanc-mange, generally afford sufficiently varied ways of giving milk. Freshly made chicken jelly is less liable than beef-tea to increase the abdominal symptoms, and I use it in those cases in which milk, even with lime water, disagrees, but in my experience such an occurrence is very rare, and when encountered is usually in a person chronically dyspeptic. For years I have made the administration of two or three cups of really good tea or coffee between daybreak and two in the afternoon a regular part of the treatment of every case of fever, unless there was in the state of the nervous system some evident contra-indication. I did this in consequence of the well-known observations of Dr. Parkes on the effect of coffee in increasing the elimination of urea in fever, and I am satisfied that both it and tea lessen drowsiness and prostration, and increase the secretion of urine; once or twice in the day they may be given, poured upon a well-whisked egg, and thereby an additional means of nourishing the patient is obtained. I agree with those who consider alcoholic stimulants in any quantity seldom needed in enteric fever.

Cold baths I have systematically employed since Dr. Cuming in his Report on Medicine in this Journal (May, 1869), drew attention to their use in enteric fever. I have not given them at such short intervals as recommended by Jürgensen and by Bartels and Liebermeister; three, or at most four are given in the twenty-four hours. In the hospital we have full-sized baths, which run on castors, one of these is brought to the bedside, half full of water at 75° Fahr., and if the temperature of the patient exceed 102° Fahr., he is lifted out and laid in the bath; he is kept in it for a period varying from five to fifteen minutes, and then quickly dried and put back to bed. The bath is usually most grateful to the patients; they often say it makes them feel strong, and after the evening bath they commonly fall into a sound sleep. I have used it with manifest benefit where cooing and wheezing râles existed in the chest, and where deficiency in the percussion resonance posteriorly and muco-crepitus indicated postural stasis in the lungs; but I have never used it when there was hæmorrhage from the bowels, or such pain as to justify the fear that peritonitis existed. There is sometimes slight chilliness in the extremities after it, and a little shivering. This indicates that the bath should not be a prolonged one, but does not forbid its use. Twice, however, I have considered it unsafe to continue the baths, once because a marked shivering followed, and once because the patient was alarmed by it. In cases in which the disease is running a mild course I only give one bath in the day, at the height of the usual evening paroxysm of fever.

By a dietary such as I have described, and by the systematic employment of the baths, I am convinced the severity and danger

of enteric fever are greatly diminished, and the occurrence of any of the serious accidents incidental to the complaint rendered very rare; but I do not believe that its duration is appreciably shortened.

Besides these means there are others which I have found of material benefit when certain conditions were present.

When during the first eight days the face is flushed and there is headache, a high temperature and a thickly coated tongue, and when the evacuations, three or four in the twenty-four hours, are neither very large nor very liquid, a dose of calomel from four to six grains, perceptibly lessens the heaviness of the fever. I have sometimes given the calomel a second time, after an interval of a day or two; but never oftener; it increases the evacuations during the twelve hours after its administration, but never in my experience sets up troublesome purging.

In enteric fever it is not uncommon to find a patient lying on his back, perceptibly impeded in his breathing, his abdomen tumid and projecting, but not markedly tender, and on inquiry it will be found either that the bowels have not acted for twelve hours, or that though the stools are frequent, only a very little fæcal matter with wind passes each time. In such a case great relief is obtained by giving a draught containing two drachms of castor oil, with one or two of turpentine. If for any reason the physician hesitates in ordering this, he may have a warm water enema administered, but the draught relieves much more completely.

In my experience poultices and fomentations have not proved so useful as their constant recommendation by authors led me to expect; their weight, and the bandaging necessary to keep them properly applied render them anything but grateful to most patients, and I now seldom employ them except when the abdomen is tympanitic, in which case the turpentine stupe is of undoubted utility.

Since I have kept my patients rigidly to the diet I have mentioned, I have not often found it necessary to give medicines to check looseness of the bowels; three or four actions in the twenty-four hours seldom do any harm; when it is necessary to interfere I have found by far the most useful remedy a pill, the use of which Dr. Hudson some years ago suggested to me, it contains one-sixth of a grain of carbolic acid, one-sixth of a grain of opium, and three grains of bismuth. This combination I have found so admirable for moderating diarrhœa and tympanitis that I have seldom employed any other; two, three, or four pills may be given during the day and night; of other remedies sulphuric acid is, I think, the best.

Hæmorrhage from the bowels is also rare when milk diet and cold baths are employed; when it occurs, gallic acid, a scruple every second or third hour, and turpentine were the remedies

upon which, until lately, I relied; in consequence, however, of the power of arresting hæmorrhage, which ergotin has recently been shown to possess, when administered hypodermically,* I some weeks ago made up my mind to try it in the hæmorrhage of typhoid, as soon as a case presented itself, and as far as the experience of a single one goes, I have reason to be well satisfied with the experiment. On the morning of the fourteenth day of enteric fever, blood appeared in the discharges of a patient now under my care in the Adelaide Hospital; when I visited her at noon I found more than a pint of clots had come away, and while I was in the ward more than half a pint of pure blood, partly clotted and partly liquid was passed, at the same time the features became sunken, and the extremities cold. I then injected five grains of ergotin, and repeated the injection at three o'clock. Within half an hour of the first injection about three ounces of blood escaped from the bowel, but none came again till four o'clock the following morning, when half a pint of clots escaped, and a third injection was used; the only other treatment employed during that day and night was the application over the ilio-cæcal region of an ice bag. There was no further discharge of pure blood; the three or four next stools were, however, blackish, and as a precaution three twenty-grain doses of gallic acid were given on each of the two following days.

There is a group of nervous phenomena sometimes present in typhoid fever, for which, I believe, the remedy is a full dose of quinine. I have seen similar symptoms occurring at the commencement of cerebro-spinal fever relieved by quinine, and was led in consequence to try it in the enteric disease. A delicate lad of fourteen, in whose case I had the advantage of Dr. Hudson's counsel, was attacked with enteric fever when recovering from a pulmonary affection; most of the febrile phenomena, though quite characteristic, were not severe, but in the beginning of the third week, although the bowels were free and the urine abundant, he became drowsy, and his breathing and pulse of the character which indicates cerebral oppression, it became difficult to arouse him sufficiently to swallow, and for several days he did not speak; a blister was applied to the nape of the neck, and turpentine with ether, and a moderate allowance of brandy given, but without marked effect on the cerebral symptoms; after these had persisted five days, he was in the following condition:—He lay as if heavily asleep, with difficulty could

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* I have found the hypodermic injection of ergotin check violent hæmoptysis in acute phthisis, and arrest rather profuse hæmaturia in a case which is probably one of malignant disease of the kidney. I use five grains suspended in twenty or thirty minims of distilled water; severe pain and swelling have invariably followed the injection, and I now always throw it into the loose cellular tissue of the buttock, where it produces less suffering than if injected into the arm.

he be roused to swallow; he never spoke, and when I succeeded in getting him to put out his tongue he did not draw it back again till again aroused; he only indicated by restlessness when his bladder and bowels were going to act; his morning temperature was 104°, his respiration 52, and his pulse exactly equalled the respirations, it was also 52, and had a distinct intermission every fifteen or twenty beats; six grains of quinine were now given, and the dose repeated in twelve hours. The following morning the temperature was 101°, the respirations had fallen to 40, and the pulse risen to 68 without intermissions. A third and fourth dose of quinine were given, and the turpentine continued, and, though slowly, the cerebral symptoms disappeared, and the lad made a good recovery. I think it is probable these symptoms indicate venous stasis or serous effusion at the base of the brain; but whether this be so or not, it is necessary carefully to distinguish the condition, to which I now allude, from the cerebral oppression due to deficient secretion of urine, the most common cause of stupor in fever, and one which, of course, requires a very different treatment.

The opinions I have formed as to the best way of combatting other dangers in enteric fever, do not materially differ from those to be found in the text-books, and I will, therefore, merely state the measures which, out of the various ones enumerated in these works, I have found the best.

For delirium and wakefulness, in the early stage, leeches to the temples, and, later, provided the urine be fairly abundant, a dose of four, five, or six grains of Dower's powder will be found superior to any of the hypnotics recently introduced; headache may sometimes be temporarily relieved by the application of the vapour of bisulphide of carbon, as suggested for neuralgic headache, by the late Dr. Kenyon, but cutting the hair and leeching are the remedies for severe headache.

Nausea and persistent retching in the early days may usually be relieved by an emetic of ipecacuanha, and later on in the fever, by ice and by draughts containing ten grains of bicarbonate of soda, ten grains carbonate of bismuth, and four minins of prussic acid.

Scantiness of urine requires dry cupping of the loins, effectually performed, and the internal use of the salts of potash and the spirit of nitrous ether. The former of these measures is not, I think, adopted in fever as often as with advantage it might be; when actual stupor with suppression of urine occurs it is a remedy on which most physicians rely, but I am sure that it is often desirable to resort to it when there is merely drowsiness and confusion of mind coincident with a scanty renal secretion. A stout young woman, for whom, under these circumstances, I lately prescribed cupping, told me the next morning she felt "altogether different" after the cupping, there was conscious-

ness of amendment, a symptom of great prognostic value in fever.

Indications of more or less pulmonary congestion are very usual in enteric fever, and often do not call for interference. When there are cooing and wheezing râles, and the sleep is broken by fits of coughing a turpentine stupe at bed-time is usually sufficient to relieve. When there is any deficiency of resonance posteriorly I attach most importance to the precaution on which I first heard Dr. Stokes insist, of not allowing the patient to remain on his back, but keeping him alternately on his right and left side, supported if need be by pillows. For graver chest symptoms, turpentine, ether, and brandy are the only remedies on which, I think, any reliance can be placed.—*Dublin Journal.*

Cutaneous Absorption.

In a recent note to the Paris Academy, M. Bernard writes as follows:—

I desire to submit to the Academy an account of experiments made in the Vincennes Asylum as to cutaneous absorption in baths of medicamental vapour. In such an institution, among patients with various chronic affections, I am favourably situated for experimenting on this question on a large scale.

Reveil's memoir on the subject gives the facts which are known up to the present. "Absorption in the bath," he says, "only takes place in rare and exceptional circumstances; it is facilitated by washing the skin, continued rubbing, and by certain irritant and solvent substances."

The bath apparatus consisted of a furnace, a boiler, a chamber in which the steam coming from the boiler was charged with the substance to be applied, and a wooden cage, in which the patient was seated while enveloped in the vapour.

I used iodide of potassium in my experiments—(1), because it is not volatile; (2), because its presence in urine is easily determined by nitric acid and chloroform; (3), because, in seizing the iodine set at liberty by the nitric acid, the chloroform takes a rose colour varying in a marked way with quantity, and thus, by comparing with a graduated scale, one may determine pretty accurately, and without quantitative analysis, the quanitity of iodide of potassium in the urine.

The skin of the subjects experimented on was intact, without wound or scratch. The urine was examined before the bath was taken, and the absence of iodine ascertained. By a respiratory tube, the patient breathed the external air through his mouth, the nostrils being pinched. A thick sheet of caoutchouc was bound by a T-bandage over the anus; the penis was sheathed in the same material; while the hands and feet were wrapped in cotton and gummed taffeta.

The subject was then placed in the cage, and subjected for thirty minutes to vapour from the mixing chamber, into which there had been put 20 grms. of iodide of potassium. The temperature in the cage was gradually raised to 45°; the skin of the subject became wet. He was then wrapped in a woollen covering and put in bed, when profuse perspiration took place. The urine analysed two hours after the bath gave a rose color: some taken three hours after gave a much more lively colour; thus affording clear proof of the absorption of iodide of potassium through the skin, the only way it could have entered the system. Besides, if it had entered by pulmonary passages it would have been eliminated immediately after the bath. These first experiments, then, prove the fact of cutaneous absorption.

In a second series I sought to determine to what temperature the air, mixed with medicamental vapour, must be raised, in order to the absorption taking place.

A very sensitive thermometer was applied to the breast of the subject, and the temperature of the bath varied in the series of experiments from 30° to 38,° the time being, as before, thirty minutes. I only found the absorption take place when the temperature was 38° (or one degree above the temperature of the body). Indeed, the sebaceous matter in the cells of the epidermis only commences to dissolve at 38° when the skin is really wet; it is then that imbibition takes places, and consequently absorption. The iodide of potassium, conveyed mechanically by the vapour, penetrates the epidermis, whence it passes into the capillary blood system and the other organs.

Thus we understand how absorption does not generally take place in a water-bath. Owing to the density of the water, and its great specific heat, the temperature of such baths is usually not raised beyond 30° to 33°. Dr. Homolle remained in a bath at 34° or 35°; would he have been able to bear 38° or 39°? Besides, the liquid layer touching the skin is not constantly renewed, as in the vapour-bath.

I succeeded, however, in obtaining the cutaneous absorption at a temperature under that of the body, in the following way:—

The subject had first a simple vapour-bath, to destroy the sebaceous matter; his skin was washed and carefully dried, and he was replaced immediately in the cage, where he was exposed to the vapour of iodide of potassium for thirty minutes, the temperature of the bath varying, in several experiments of this kind, from 34° to 36°. Two hours after a bath at 34° the colouration of the urine was slightly rose; after a bath at 36° it was much more distinct.

M. Colin has described an experiment in which he allowed water charged with cyanide of potassium to fall for five hours' time on a horse's back. This caused the death of the animal; the

sebaceous matter having been destroyed through percussion, and cutaneous absorption taking place.

In the sand-baths at Cette and Arcachon, which are found so efficacious for scrofulous affections, tumours, &c., what takes place? The temperature being considerably above that of the body (over 40°), the skin is wet, the sebaceous matter dissolves in the perspiration, and there follows absorption of the salts contained in the sand.

I have not been able to find free iodine in the urine; the use of nitric acid has always been necessary. Besides iodine once introduced into the system soon forms various compounds.

In summing up his results, M. Bernard further mentions that the elimination of the salt, commencing two hours after the bath, increases in quantity till a meal is taken, after which it diminishes (probably because of the water received into the system). and then again increases. It ceases completely twenty-four hours after the bath, whatever the amount of the salt, the temperature, or the duration of the bath.—*Chemical News.*

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*Dr. Boggs on Eucalyptus Globulus as a substitute for Cinchona preparations.**

I believe that the new substances extracted from the *Eucalyptus Globulus* will play an important part in Therapeutics. I do not propose to enter into every detail of the medicinal properties of this magnificent tree, for they have been already ably described by Professor Gubler. I desire merely to draw attention to some of its properties as yet little known. Besides its application as a febrifuge, it is used in all cases in which antispasmodics are indicated, and advantage has been taken of this property to use the drug as a substitute for *Datura stramonium.* Thus, in England the leaves have been employed in cigarettes as a remedy for asthma, and in all cases complicated with pain and insomnia.

Experiments have shown that all parts of this gigantic tree, the leaves, the bark, are impregnated with febrifugal properties. According to analyses which have been made, a substance has been found in them identical with the salt of quinine which is found in cinchona, and which behaves similarly with strong acids; and where it is combined with sulphuric acid a crystallized salt is formed completely analogous to sulphate of quinine. To make sure of the resemblance between these two salts, experiment has been advanced farther and the result of a combination of chlorine and ammonia with the Eucalyptus salt was exactly

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* **Letter to the Editor, Journal des Connaissances Médicales.**

the same as with quinine, that is to say, a green coloration was produced.

An attempt has been made to acclimatize this tree in Austria; but it was found that its medicinal properties were much less strongly marked than in its native country. Nevertheless it was established that it was most serviceable in certain obstinate cases of intermittent fever in which even quinine had failed. It was observed, besides, that the duration of treatment was less under Eucalyptus than under quinine; and that of all preparations the tincture appeared to be the best, because it contains, besides the extract (which is like the resin of cinchona and which, consequently includes the active principle of the tree); an essential camphorated oil. This tincture, having an aromatic odor is very pleasant to take, especially with simple syrup or syrup of oranges. In trifling cases two or three tea-spoonsful immediately before the paroxyssm are sufficient to suspend it: but when the fever is attended with cachexia, it should be administered in small doses, morning and evening, for some time. As the therapeutical action of this tree is analogous to that of the cinchona the salt or active principle of the Eucalyptus, as well as its other parts are exhibited in the same doses and in the same form as corresponding doses of cinchona.' The distilled water of the Encalyptus supplies, besides, an agreeable vehicle for a crowd of medicines, stimulants especially. We have, therefore, a true substitute for cinchona, the price of which is always high and the supply of which threatens to fail. To be prepared for such a calamity it would be desirable to search for other plants besides cinchona which contain quinine.

MEDICAL INTELLIGENCE.

Gradation List of Officers of the Madras Army of the rank of Major as they stood on the 30th June 1872.

Rank.	Names.	Corps.	Date of Rank.
M.	F. W. Gregory	44th F.	15th Feb. 1861.
"	J. Penton	89th F.	5th April 1864.
"	S. H. E. Chamier	R. A.	11th Oct. "
S.	J. M. Joseph, M.D.	M. E.	14th Dec. "
"	E. S. Cleveland, M.D.	"	" "
"	W. H. Harris, M.D.	"	13th Feb. 1865.
"	W. H. Rean, M.D.	"	14th May "
M.	F. Cobbe	R. A.	14th June "
"	B. L. Forster	"	12th July "
S.	H. T. Shaw	M. E.	10th Sept. "
"	A. Sanderson, M.D., M.A. ...	"	20th October "
"	C. Cooper, M.D.	"	20th Nov. "
"	J. McDonald, M.D., F.R.C.S.E. ...	"	14th Feb. 1866.
"	S. J. Wyndowe, M.D.	"	24th March "
"	W. R. Cornish, F.R.C.S.	"	1st April "
"	J. S. Morton, M.D.	"	10th June "
"	A. H. Beaman	"	10th " "
"	J. P. Nash, M.D.	"	20th " "
M.	E. G. Campbell	S. C.	11th August "
S.	G. S. W. Ogg, M.B.M.A.	M. E.	12th Sept. "
S.	J. Shortt, M.D.	M. E.	20th " "
M.	F. C. D.'E. Barclay	24th F.	29th October "
"	C. M. Playfair	R. A.	11th Dec. "
"	A. H. Cooke	S. C.	11th " "
"	R. V. Handyside	"	12th " "
"	W. O. Swanston	"	20th " "
"	W. H. R. Godfrey	"	do. " "
"	C. M. Hailes	"	do. " "
"	A. D. Glay	"	do. " "
"	C. D. Clementson	"	26th " "
"	A. Gahagan	"	26th " "
"	C. F. J. Skottowe	"	26th " "
S.	D. C. McAllum, M.D.	M. E.	30th " "
M.	G. Kallender	S. C.	2nd Jan. 1867
S.	W. N. Chipperfied	M. E.	3rd " "
M.	A. C. Lilly	S. C.	20th " "
"	H. Fraser	S. C.	20th " "
"	W. Munro	S. C.	20th " "
"	W. H. P. G. Bluett	10th Foot	22nd " "
S.	W. Pearl	M. E.	24th " "

Gradation List of Officers, &c.—continued.

Rank.	Name.	Corps.	Date of rank.
S.	G. Marr, A.M. & M.D.	M. E.	24th Jan. 1867.
"	W. Doyle, M.D.	"	24th " "
"	E. E. Lloyd	"	24th " "
"	T. Lowe	"	24th " "
M.	C. M. White	S. C.	26th " "
"	R. K. Macquoid	"	26th " "
"	C. A. McMahon	"	4th Feb. "
S.	M. C. Furnell, F.R.C.S.	M. E.	7th " "
M.	C S. B. Walton	S. C.	20th " "
"	J. Woodcock	"	1st March "
"	M. K. Bourne	"	13th " "
"	G. B. Bowen	"	17th " "
"	G. L. Griffin	45th F.	19th " "
"	P. P. L. Stafford	S. C.	20th " "
S.	G. A. Burn, M.A.	M. E.	30th May "
M.	C. Raikes	R A.	11th June "
"	W. S. Drever	S. C.	11th " "
"	J. R. S. Henderson	"	30th " "
"	I. V. Morris	"	26th July "
S.	T. Croudace	M. E.	4th Aug. "
"	R. Dempster	"	4th " "
"	J. Houston, M.D.	"	4th " "
"	H. E. Busteed, M.D.	"	4th " "
"	H. Crocker, M.D.	"	4th " "
"	R. Arnold	"	4th " "
"	H. Adam	"	4th " "
"	W. H. Morgan	"	4th " "
M.	C. Barton	18th H.	14th " "
"	R. C. A. Marshall	S. C.	20th " "
"	A. R. McMahon	"	20th " "
"	T. W. Stansfeld	"	21st " "
"	A. H. M. Dickey	"	21st " "
"	W. H. White	"	22nd Sept. "
"	G. E. Bulger	10th F.	6th Nov. "
"	J. B. Swete	R. A.	10th Dec. "
"	C. L. Pereira	"	10th " "
"	C. J. Smith	"	10th " "
"	E. L. Hankin	"	10th " "
"	H. E. Ryves	"	11th " "
"	P. Salter	"	11th " "
"	S. C. Montgomerie	"	11th " "
"	B. J. C. Prior	"	20th " "
"	H. T. Duncan	"	20th " "
"	C. C. Minchin	"	20th " "
"	D. Shaw	"	8th Jan. 1868.
"	O. Morgan	"	11th " "
"	J. Duval	"	11th " "
"	R. S. Burge	"	11th " "
S.	H. King, B.A., M.B.	M. E.	11th " "
M.	A. T. Baldwin	"	13th " "
"	F. A. Fenton	"	20th " "

Gradation List of Officers, &c.—continued.

Rank.	Name.	Corps.	Date of rank.
M.	J. Allardyce	S. C.	20th Jan 1868
,,	H. Norris	2 C. L. S.	20th ,, ,,
,,	R. Farrer	S. C.	20th ,, ,,
,,	A. G. Duff	36th I.	20th ,, ,,
,,	R. H. Beddome	S. C.	20th ,, ,,
S.	B. Williamson, M.B.	M. E.	30th ,, ,,
M.	G. A. Arbuthnot	8th Ca.	5th Feb. ,,
,,	A. Templeman	21st Foot.	15th ,, ,,
S.	G. Bidie, M.B.	M. E.	20th ,, ,,
,,	J. G. Reed, M.D.	,,	20th ,, ,,
,,	J. Henderson, M.D.	,,	20th ,, ,,
,,	H. M. Ross, M.D.	,,	20th ,, ,,
,,	C. T. Eves	,,	20th ,, ,,
,,	J. S. Ridings, M.D.	,,	20th ,, ,,
,,	J. J. Heffernan	,,	20th ,, ,,
,,	D. W. Trimnell	,,	20th ,, ,,
M.	A. B. Cumberlege	C. S.	25th ,, ,,
,,	W. M. Parratt	,,	25th ,, ,,
,,	D. Standen	,,	25th ,, ,,
,,	R. S. J. Prendergast	2nd C.	20th March ,,
,,	J. E. Baillie	S. C.	20th ,, ,,
,,	B. F. A. Heysham	,,	3rd April ,,
,,	G. F. Gildea	21st F.	14th ,, ,,
S.	C. A. Andrews	M. E.	25th ,, ,,
M.	W. H. G. Palmer, ...	S C.	9th June ,,
,,	W. Hands	,,	9th ,, ,,
,,	T. L. Scott	,,	9th ,, ,,
,,	G. De la P. Beresford	,,	10th ,, ,,
,,	S. Galbraith	,,	10th ,, ,,
,,	W. Osborn	,,	10th ,, ,,
,,	E. Hill	,,	10th ,, ,,
,,	T. T. Turton	,,	26th ,, ,,
,,	J. Hudleston	,,	3rd July ,,
S.	J. M. Donnelly, M.D. .. .	,,	3rd ,, ,,
M.	F. M. Raynsford	S. C.	10th July 1868.
S.	J. Keess, M. D.	M. E.	24th August ,,
,,	R. Wilson	,,	24th ,, ,,
,,	R. W. Cockerill	,,	24th ,, ,,
,,	C. Robertson, M. D.	,,	24th ,, ,,
,,	A. Gamack, A. M., M. D.	,,	24th ,, ,,
,,	J. Wilkins, M. D.	,,	24th ,, ,,
M.	A. M. Davies	S. C.	55th ,, ,,
,,	G. C. Close	45th F.	15th ,, ,,
,,	W. Chrystie	Engineers.	15th ,, ,,
,,	H. P. Hawkes	S. C.	15th ,, ,,
,,	W. L. Twentyman	18th Hus.	15th ,, ,,
,,	W. J. Morris	4th C.	10th Nov. ,,
S.	T. G. Howell	M. E.	12th ,, ,,
M.	J. P. Pedler	S. C.	8th Dec. ,,
,,	T. Dyer	,,	8th ,, ,,
,,	E. A. Mottet	,,	8th ,, ,,

Gradation List of Officers, &c.—continued.

Rank.	Names.	Corps.	Date of Rank.		
M.	F. J. Millar	S. C.	20th	Dec.	1868.
,,	W. G. Grove	32nd Inf.	20th	,,	,,
,,	B. H W. Magrath	S. C.	20th	,,	,,
,,	F. T. Pollok	,,	20th	,,	,,
,,	R. C. Lavie	,,	20th	,,	,,
,,	S. W. Lennox	23rd Inf.	27th	,,	,,
,,	S. New	S. C.	27th	,,	,,
,,	E. Cave	,,	27th	,,	,,
,,	W. R. Mesham	,,	27th	,,	,,
,,	J. L. Benwell	,,	20th	Jan.	1869.
,,	R. B. Kennedy	23rd Inf.	20th	,,	,,
,,	G. M. Payne	S. C.	20th	,,	,,
,,	C. B. L. Smith	,,	20th	,,	,,
S.	J. Ross, M. B.	M. E.	29th	,,	,,
,,	S. T. Heard, M. D.	,,	29th	,,	,,
,,	W. A. Smith, M. D.	,,	29th	,,	,,
,,	W. F. deFabeck	M. E.	29th	,,	,,
,,	G. E. Whitton, M.B. & B.A. ...	,,	29th	,,	,,
,,	T. Beaumont, M.D.	,,	29th	,,	,,
M.	C. H. Beddek	S. C.	7th	Feby.	,,
,,	W. Kincaid	,,	3rd	March	,,
,,	W. G M. Strickland	,,	3rd	,,	,,
,,	J. Swiney	,,	12th	April	,,
,,	E. B Sladen	,,	14th	,,	,,
,,	R. T. Snow	,,	8th	June	,,
,,	H. H. Foord	,,	9th	,,	,,
,,	C. J R. Bell	,,	9th	,,	,,
S.	W. P. Kelly	M. E.	9th	,,	,,
M.	W. Hudleston	S. C.	13th	,,	,,
,,	R. H R. Rowley	R. A.	20th	,,	,,
,,	C. J. Richards	38th I.	13th	Aug.	,,
,,	W. H. Whitlock	S C.	23rd	,,	,,
,,	S. Hodgson	2 C.	9th	Sep.	,,
,,	F. C. Trent	48 F.	18th	,,	,,
,,	F. Horsley	S. C.	20th	Nov.	,,
,,	F. G. Hankin	,,	11th	Dec.	,,
,,	L. H. Isacke	,,	11th	,,	,,
,,	J. O. Mayne	Engr.	11th	,,	,,
,,	C. S. Milman	R. A.	12th	Dec.	,,
,,	H. D. Cloete	S. C.	12th	,,	,,
,,	H. S. Stuart	,,	12th	,,	,,
,,	F. F. R. Bishop	,,	12th	,,	,,
,,	H. C. Menzies	,,	12th	,,	,,
,,	A. T. Searle	,,	12th	,,	,,
,,	J. D. Vallance	,,	12th	,,	,,
,,	J. H. Pelle	R. A.	19th	,,	,,
,,	W. R. Johnson	S. C.	20th	,,	,,
,,	J. A. Campbell	,,	20th	,,	,,
,,	C. J. Godfry	,,	20th	,,	,,
,,	A. Drury	,,	26th	,,	,,
,,	H. F. Dakeyne	,,	20th	Jan.	1870.

Gradation List of Officers, &c.—continued.

Rank.	Names.	Corps.	Date of Rank.
M.	J. Crawford	S. C.	20th Jan. 1870.
„	O. F. Smithers	„	20th „ „
„	J. W. Orr	„	20th „ „
„	A. C. Hay	S. C.	20th „ „
„	F. Gadsden	„	21st „ „
S.	H. I. Beach	M. E.	27th „ „
M.	R. A. W. C. Stuart	17th I.	16th Feb. „
„	P. A. Carnegy	S. C.	16th „ „
„	H. G. Thomson	„	22nd „ „
„	G. J. D. Heath	„	3rd March „
„	M. B. S. Lloyd	„	18th „ „
„	J. S. Tighe	„	22nd „ „
„	E. D. Faithlough, ...	48th F.	1st April, „
S.	J. M. Miller, M D.	M. E.	13th „ „
M.	G. C. Bartholomew	10th F.	11th May „
„	A. F. F. Bloomfield	S. C.	25th „ „
S.	W. Jarquhar, M. D.	M. E.	28th „ „
„	J. Law, M D.	„	28th „ „
M.	G. F. Blair	R. A.	14th June „
„	F. L. Playfair	S. C.	14th „ „
„	G. W. Law	„	14th „ „
„	T. R. Church	„	14th „ „
„	H. M. Nepean	„	15th „ „
S.	W. Fry	M. E.	29th „ „
M.	J. H. Tripp	76th F.	12th July „
„	H C. Wilkinson	16th Lan.	13th „ „
„	A. C. Forth	S. C.	20th „ „
S.	W. J. Busteed, M.D.	M. E.	23rd „ „
„	W. F. Davis, M.D.	„	23rd „ „
„	J. M. Houston, M.D	„	23rd „ „
„	W. H. Roberts, M.D.	„	23rd „ „
„	J. Murray, M. D.	„	23rd „ „
M.	J. Bayley	16th L.	27th „ „
„	C. A. Benson	45th I.	9th Aug. „
„	W. G. Morris	1st C.	11th „ „
„	W. G. M. Crawford	24th F.	1st Oct. „
„	H C. B. Barnett	S. C.	10th Feb. 1871.
„	W. G. Ward	„	10th „ „
„	G C. Hodding	„	10th „ „
S.	J. Bilderbeck	M. E.	10th „ „
„	R. E. Pearse	„	10th „ „
„	G. D. Riddell...	„	10th „ „
„	E. M. Ross	„	10th „ „
„	J. Dougall	„	10th „ „
M.	E Feneran	48th F.	14th March „
„	C. T. Caldecott	76th F.	4th April „
„	C. S. Steward	4th Cav.	11th May „
„	E. W. Childers	R. A.	13th June „
„	T. I. M. Hog	„	13th „ „
„	R. H. Cunliffe	S. C.	13th „ „
„	H. Watson	„	13th „ „

Gradation List of officers, &c.—continued.

Rank.	Names.	Corps.	Date of rank.
M.	R. S. Gray	S. C.	13th June 1871.
„	E. M. Norie	„	16th „ „
S.	B. T. Suffrein	M. E.	27th July „
„	I. F. Barter	„	27th „ „
„	J. FitzGerald	„	27th „ „
„	A. Fergusson, M. D.	„	27th „ „
„	H. Griffith	„	27th „ „
M.	A. W. C. Lindsay	S. C.	26th Aug. „
„	F. D. Walters	44th F.	9th Sept. „
„	S. H. Clerke	21st F.	31st Oct. „
„	J. M. Williams	Inf.	15th Nov. „
„	R. C. Stewart	8th C.	14th Dec. „
„	E. D. Gompert	S. C.	20th „
„	G. J. F. Begbie	„	20th Jany. 1872.
S	G. Williamson, M. D.	M. E.	20th „ „
„	C. R. G. Parker	„	20th „ „
M.	J. C. W. Bruce	48th I.	20th Feb. „
„	W. Robertson	S. C.	20th „ „
„	E. H. R. Chambers	„	26th „ „
„	R. A. Walters	„	11th April „

(General Orders by the Commander-in-Chief.)

Officers' Mess—Troop Ship.

No. 70.

2nd August 1872.

Under instructions from the Right Honorable the Secretary of State for India, officers proceeding home by Her Majesty's troop ships are directed to provide themselves, before embarking, with sufficient funds to pay for their messing during the voyage.

Transport—Passage—Insanes.

No. 89.

With reference to G. O.* No. 214 of 1871, "Passage—Insanes," and Clauses *h*, *i*, and *j*, para. 241, Transport Regulations, Part I., the attention of the Right Honourable the Commander-in-Chief has been called to the fact, that from certain commands during the past season, insanes requiring attendance were despatched to Bombay as invalids, without any special arrangements for attendance, or report to secure

* Madras G. O. C. C. 29th November 1871, page 355.

proper provision for their accommodation at Deolalee or on boardship.

2. Insanes are never to be despatched as ordinary invalids. On all occasions when passage is required for insanes, a special report is to be made to Army Head Quarters, and instructions to be received as to their disposal from the Quartermaster-General.

Passages—Warrant Officers.

No. 90.

Under instructions from Government, it is notified that Warrant Officers, holding honorary commissioned rank, are not to be exempted from the operations of para. 16 of G. G. O.* No. 773, dated 22nd September 1864, which withholds passages at the public expense from officers moved in consequence of regimental or departmental promotion, or when transferred to a more lucrative appointment.

Military Department, No. 744, dated 12th April 1872, to the Quartermaster-General.

2. These officers do not therefore come within the terms of† G. G. O. No. 841, dated 31st August 1870.

† G. O. No. 236, dated 5th September 1870.

Native Medical Pupils.

9th August 1872.

No. 199 of 1872.—The following General Orders by the Government of India, are re-published :—

No. 772 of 1872.—Frequent complaints having been received of the idleness and inattention of many of the native medical pupils, who, under the provisions of paragraph 41 of G. G. O. No. 550‡ of 1868, are attached to Medical schools and colleges for the prescribed course of study, the Right Honorable the Governor General in Council is pleased to authorise the principals of schools and colleges to withhold or to withdraw the increase of pay given after the first year's residence from those Medical pupils who, from idleness or other misconduct within their own control, have failed to make due progress in their studies.

Each case in which this authority is exercised is to be reported, through the local Government, for confirmation by the Government of India in the Military Department.

* Madras G O G. 11th October 1864, No 402.
† " " 13th Sept. 1870, No. 266.
‡ Madras G. O. G. No. 232, dated 19th June 1868.

Station Staff Surgeons.

No. 801 of 1872.—The following resolution by the Government of India in the Financial Department is published for general information :—

No. 1318, dated Simla, the 24th July 1872,

Read.—An office memorandum from the Home Department, No. 2678, dated the 26th June, forwarding for consideration and orders, certain papers regarding the remuneration to be allowed to Station Staff Surgeons of Sub-Divisional Cantonments for the performance of Civil Medical duties.

Resolution :—The Governor-General in Council is pleased to rule that a monthly allowance of Rupees 30 from provincial funds shall be made to a Station Staff Surgeon placed in charge of the Civil Medical duties of the head quarters of a civil sub-divisional officer, and that no separate fee or other remuneration shall be given to him from the civil or military department for performance of such duties.

Exchange—Officers—British Service.

No. 808 of 1872.—Under instructions from Her Majesty's Government, and in extension of the rules laid down by the Secretary of State for War, published in General Orders by the Commander-in-Chief, No. 141 of 22nd June 1867, it is notified, for general information, that officers of the British service in India exchanging into or transferred to batteries or regiments proceeding to or under orders for India, and allowed to remain in India until their corps arrive, have no claim to receive any pay or allowances, from Indian revenues till such battery or corps is brought on the strength of the Indian Establishment.

Officers so circumstanced will not be placed on duty of any kind.

List of Children.

On account of whom Payments have been notified by the receipt of Paymaster's Statements, &c., from 31st July up to this date for securing the following rates of pension.

Names of Subscribers.	Children's date of birth.	Sex.	Rates of Pension secured.	To what period.	Payments how made.
G. Williamson ...	24th June 1872 ...	Female...	Full ...	To 21 years ...	By Donation and Subscriptions.
J. R. Theobalds ...	19th July 1872 ...	Do. ...	Do. ...	To D. or M., &c. ...	

MEDICAL FUND OFFICE,
FORT ST. GEORGE,
30th August 1872.

BOOKS, &c., RECEIVED.

Doctor ; *July.*

Medical Press and Circular; *July 3rd, 10th, 17th, 24th.*

Bangalore Spectator; *August 9th.*

Journal des Connaissances Medicales ; *July 15th*; *30th.*

Medical Record ; *May 15th* ; *June 1st*; *15th.*

The Secretaries ROYAL MEDICAL BENEVOLENT FUND SOCIETY OF IRELAND, *acknowledge with many thanks receipt of the following Subscription.*

E. Fawcett Esq., ... 1872-73. Rs. 20